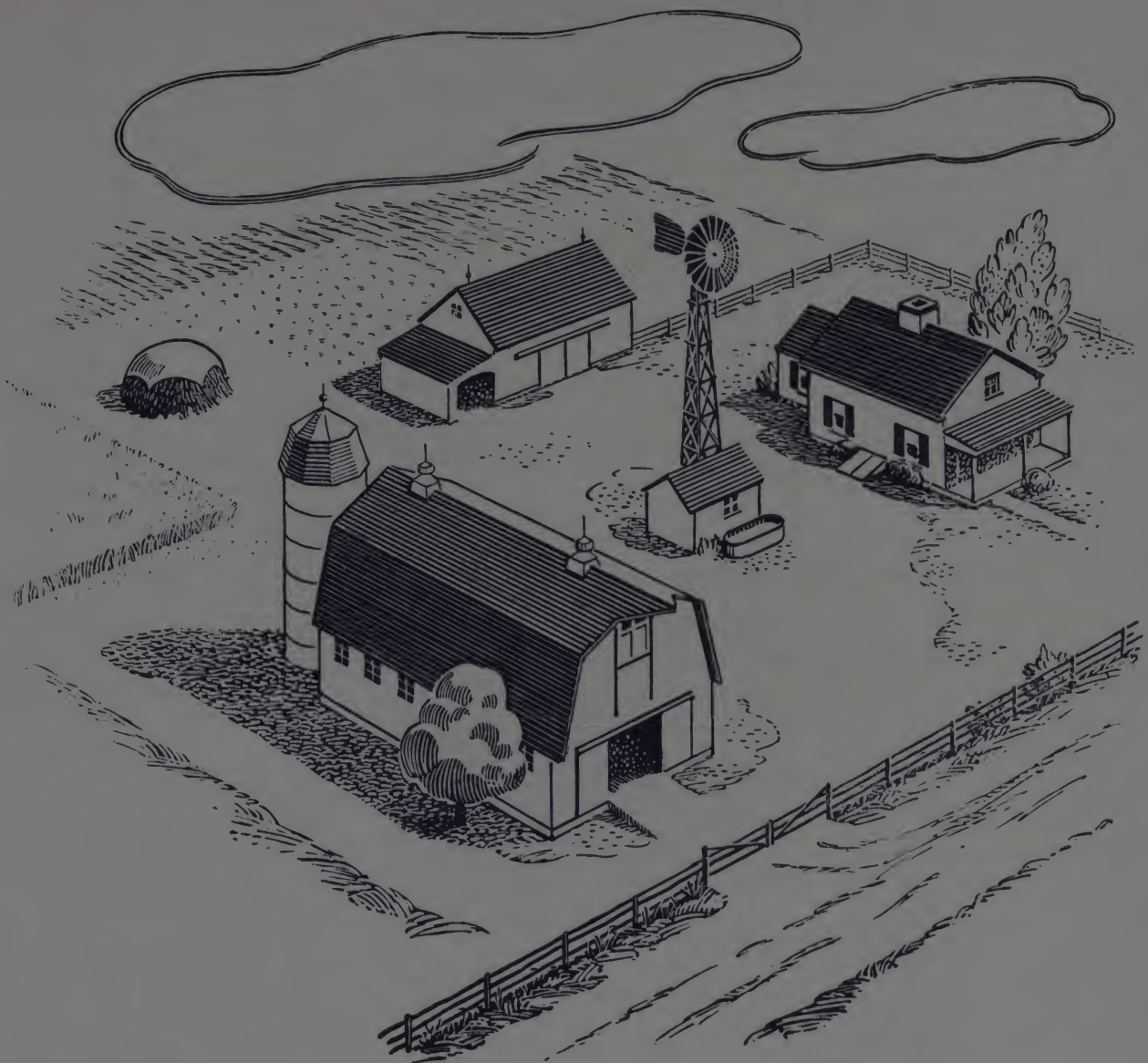


REPAIR AND MAINTENANCE OF FARM BUILDINGS



PUBLISHED BY JOHNS-MANVILLE



FOREWORD

All authorities agree that the job the American farmer does in producing food, will in a great measure, decide the winning of the war and the winning of the peace. It is recognized, however, that because of shortages of labor and materials, the farmer faces many problems in successfully carrying out this important assignment. This is particularly true in the job of keeping his farm buildings, or his "factory," in efficient operating condition.

This book was developed through the services of the Johns-Manville

Agricultural Engineering Department and is devoted to the timely objective of supplying current information on the repair and maintenance of farm buildings, and how they can be made to produce more under wartime conditions. It points out the critical parts of buildings and suggests the repairs that will make them last longer. It provides examples where non-critical materials can be used to protect and make buildings more productive. Johns-Manville sincerely hopes that the reader will find this book helpful.

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BRACING OF FARM BUILDINGS TO PROTECT AGAINST DAMAGE FROM WIND AND SNOW

Roofs that have sagged under the weight of winter snows, walls that have bulged for no apparent reason, sagging floors and leaning structures are all danger signs indicating that the structure may collapse in a heavy wind or under excessive snowload. These failures are due to the lack of proper bracing or ineffective bracing. While it is easier to do the job properly when the building is first built, many bracing deficiencies can be remedied in existing buildings.

Most failures of buildings due to improper bracing can be seen readily, and usually the defects can be repaired before great damage is done. However, it is only good operation to check your buildings to see if they have been properly braced, so that you can make the changes before trouble develops. In most instances only a little time and a few lengths of lumber will do the work. It is good insurance against wind storms and bad winter weather.

Many failures are due to improper foundations, insufficient or entire lack of anchorage of the frame to foundations or of the roof to the frame, or insufficient bracing of the frame.

The sills of frame structures should be anchored to the foundation with $\frac{5}{8}$ or $\frac{3}{4}$ inch bolts placed 6 to 8 feet apart if the foundations are continuous or at every support if the building rests on piers.

A frame building consisting only of vertical and horizontal structural members might stand for a long time, provided it were not subjected to unequal pressures applied in various directions. Thorough bracing of the frame is necessary if it is to resist the stresses set up by heavy winds or unequal or moving loads.

To transmit or resist these weights or pressures a piece of material is used called a brace. It is used as a tie or strut in connection with other structural members to form triangles which tend to prevent distortion of the struc-

ture. The method of bracing, will vary somewhat with the design of the building, but the general principle of using braces to form triangles with other structural members should be observed.

Buildings having walls of stud construction should be braced at each corner in both directions with a diagonal member (Fig. 1) extend-

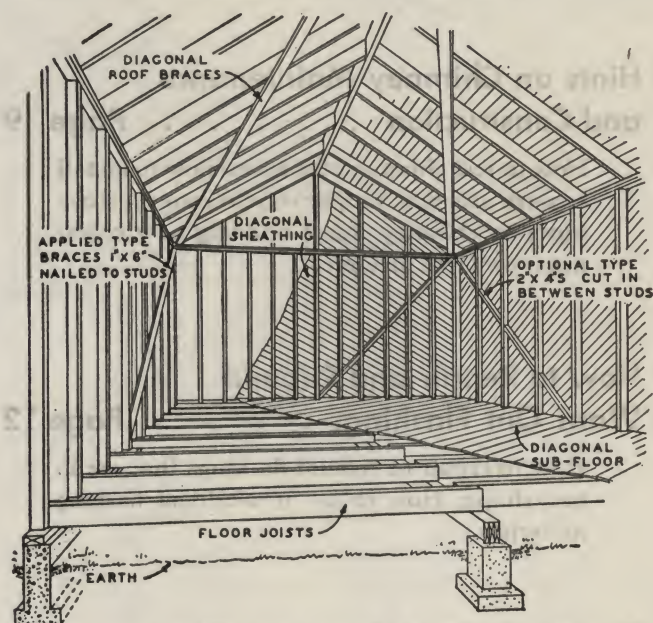


Fig. 1—Diagonal bracing at the corners to strengthen buildings of frame construction.

ing from plate at the corner downward to the sill. This brace can be nailed to the inside face of the studs or cut in between the studs if interior finish is to be used. A 1 x 6 inch brace nailed to the stud is customary or 2 x 6 inch cut-in brace. The cut-in bracing should fit tightly.

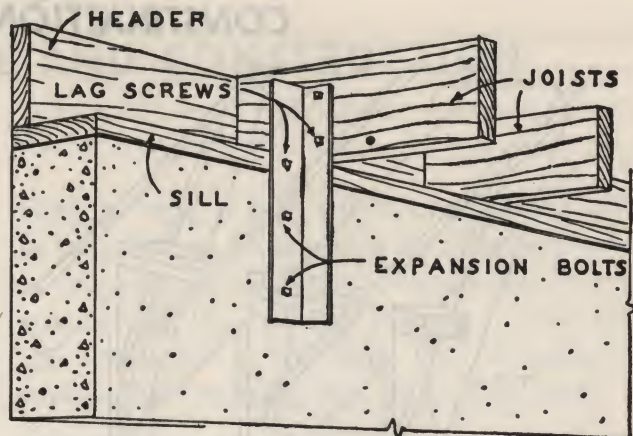
To prevent racking of the roof, diagonal braces of 1 x 6 inch board should be nailed to the under side of the rafters, running diagonally from plate to ridge, as nearly as possible to an angle of 45°.

Sway-backed gable roofs usually are the result of a lack of crossties which should be provided to prevent spreading of the rafters and

and should extend over several studs so as to prevent tearing out of the plate or any of the individual studs.

The jacks under the ridge should be raised and the turnbuckles tightened successively and a little at a time. After the walls have been straightened the tie-rods should be supported from the rafters by light rods.

Fig. 8—Using angle irons in an existing building to anchor sill.



SIDEWALL BRACING

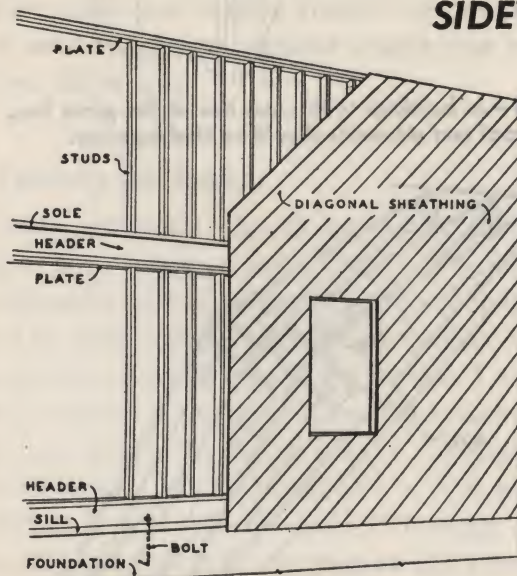


Fig. 9—Diagonal sheathing gives added stiffness.

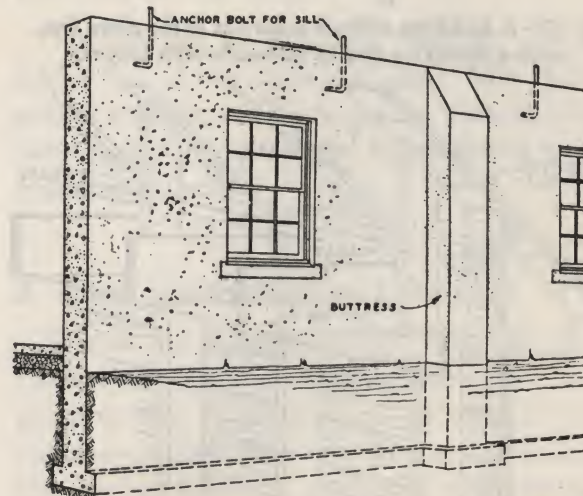
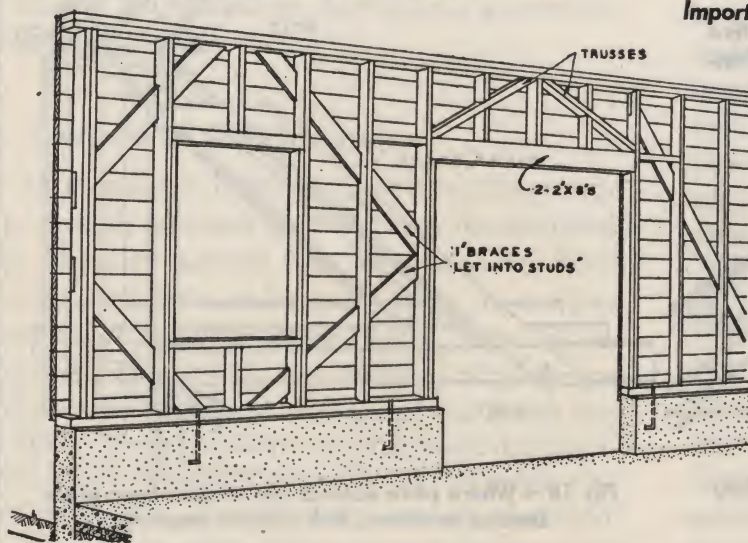


Fig. 10—Masonry walls should be braced with a buttress. Important in buildings where there is outward pressure.



BRACING AROUND DOORS AND WINDOWS

Fig. 11—Studding should be doubled around all openings. Braces should be used as indicated to prevent sagging.

CONSTRUCTION OF ROOF TIES

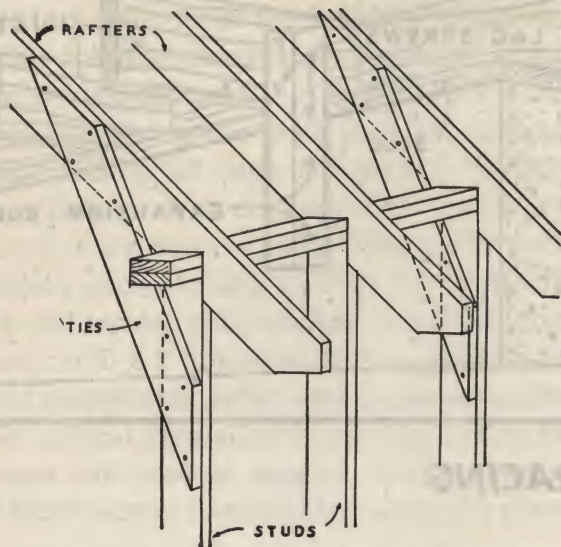


Fig. 12 - In buildings without cross ties at the plate line, rafters should be tied to sidewalls with braces.

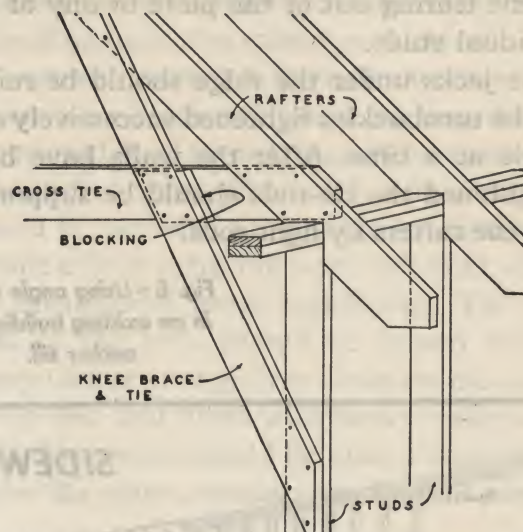


Fig. 13 - In buildings with cross ties at the plate line, roof and sidewalls should be tied together.

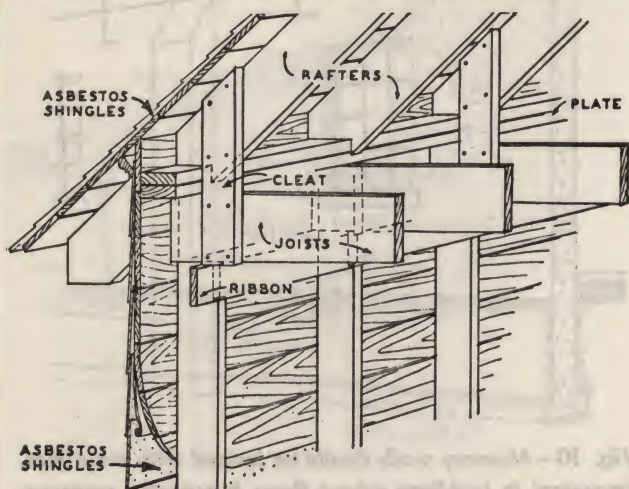


Fig. 14 - In existing structures the rafters can be tied to the joists with a cleat. This permits flush ceilings.

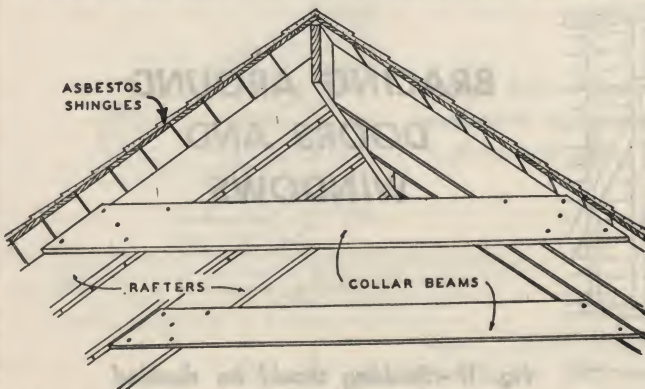


Fig. 15 - Brace roofs with collar beams, suspend hay track from collar beams, not from ridge pole.

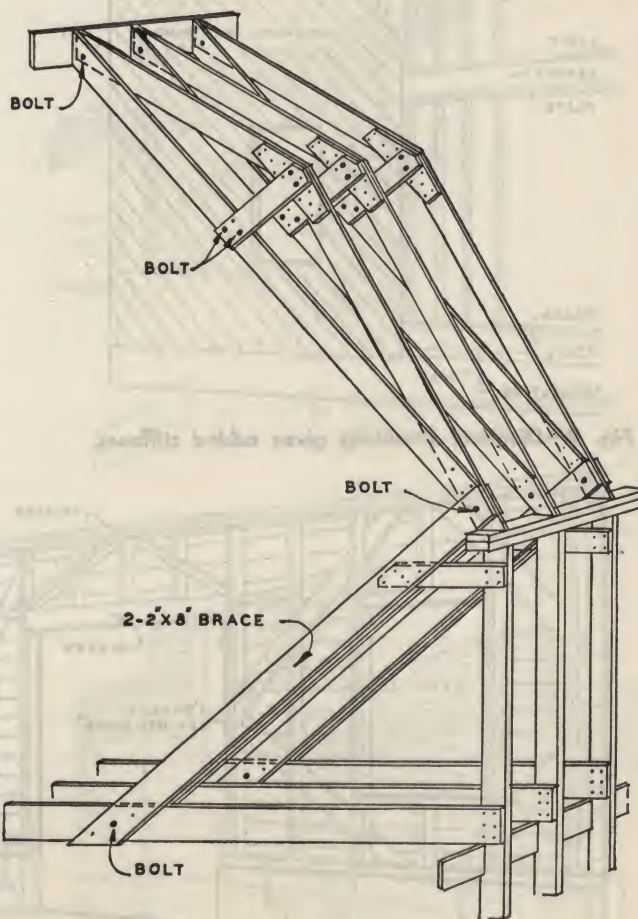


Fig. 16 - Where plate extends above mow floor, place bracing as shown, bolt and nail securely.

HINTS ON CHIMNEY MAINTENANCE AND CONSTRUCTION

Defective flues and chimneys are war hazards that no American farm can afford. Chimneys can be made safe in most instances by correcting defects and installing a spark arrester on the chimney itself, to eliminate roof fires due to sparks, or chimney burn outs. In some cases, if the chimney has been poorly constructed the best thing to do is to rebuild it.

The following points should be considered in a war campaign against losses due to defective chimneys:

1. Testing for leaks:

Every chimney should be tested for leaks before connecting a stove to it. It is wise to periodically test old chimneys too if there are signs of settlement or cracks in evidence. It is easy to do, and you can do it yourself. To try it, build a straw or tar-paper fire at the base of the flue, and when the dense smoke is passing up the chimney, block the outlet at the top by covering it with a wet sack. If leakage exists you will see smoke emerging at the break. If the test shows a leak, repair it before using the chimney. Any chimney that leaks is a potential source of trouble.

2. Support of the chimney:

All chimneys should be built from the ground up, and should rest on their own foundations. No chimney should rest on a wooden floor, beams, brackets or be hung from the rafters, because beams supporting heavy loads will deflect and shrink with age. Sagging of the beams injures the walls and ceilings of the house and is apt to crack the chimney and make it dangerous. Most chimneys extend well above the roof to be effective, exposing large areas to the wind; and unless the foundations are solid, they are

likely to sway in high winds, opening the joints at the roof line. Cracks and openings in the flue at this point are especially dangerous, because sparks from the flue may come in contact with the woodwork in the roof. This swaying can rupture the flashing, too, and cause leaks.

If you must rebuild your chimney use a cement mortar. The United States Department of Agriculture recommends the following proportions for the mix:

To one bag of Portland Cement (94 lbs.), add 9 lbs. of dry hydrated lime. Mix these together and then add 3 times the volume of clean sand with sufficient water to produce a working consistency.

3. Roof construction at Chimney:

Where the chimney passes through the roof the construction should provide space for expansion due to settlement, movement of the chimney in high wind and temperature changes. Copper has been the preferred metal to use for flashing at this point because it is easier to handle than the cheaper galvanized sheet metal and because galvanized metal corrodes in time from the underside as well as the exposed surface. Lead and zinc should not be used as chimney flashings, because in the event of fire under the roof they will melt and leave an opening to create a draft.

Asbestos felt flashings have been used industrially for this purpose for many years and have proved highly satisfactory. Since the war, this type of flashing material has been made available to the farmer and home owner and is available at most local lumber yards. It is fire-proof, easy to apply and has a long life. For details of building a chimney flashing with

HINTS ON CHIMNEYS

asbestos (American Colonial) felts see Fig. 17 and 18. For further information, see Chapter "How to Repair and Rebuild Worn Out Flashings," Page 12.

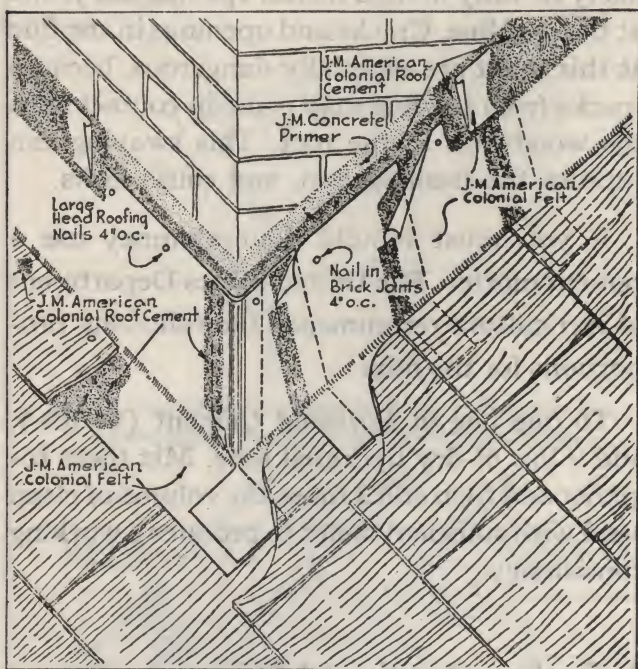


Fig. 17 - How to properly apply the asbestos chimney flashing.

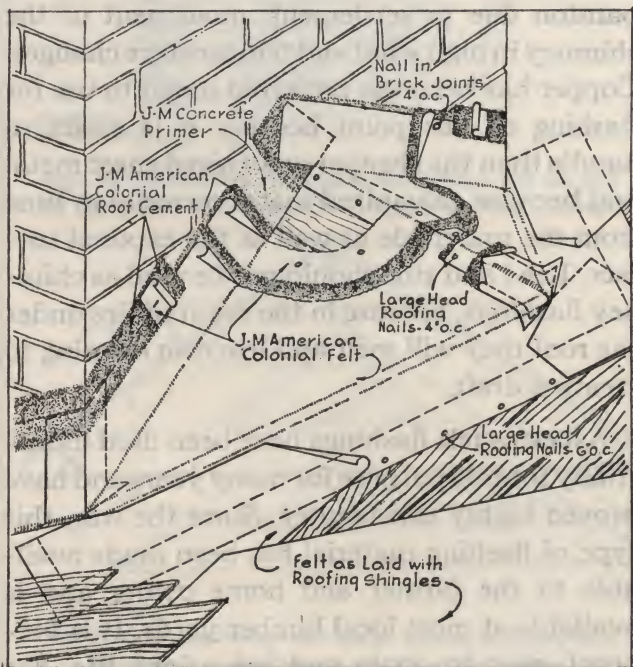
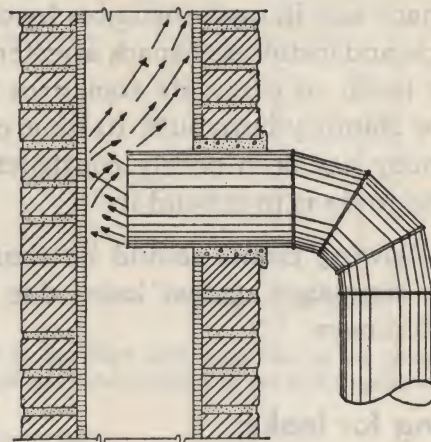


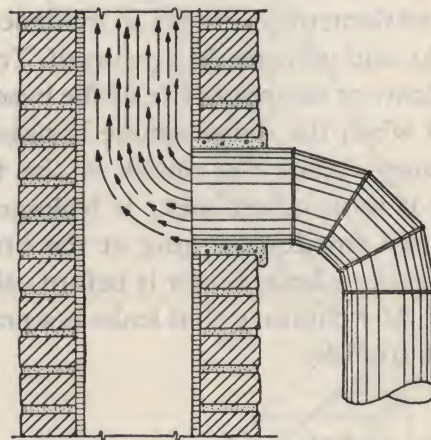
Fig. 18 - How to flash the chimney cricket with asbestos felt.

4. Chimney Connections:

In setting the stove pipe into the chimney opening, care should be taken to assure a tight fit, and the pipe should not project into the flue lining.



WRONG



RIGHT

Fig. 19 - The wrong and right way to fit stove pipe.

The pipe itself should enter the chimney horizontally and the connection should be made with fire clay set tightly in masonry. The space around the pipe should be sealed air-tight by a closely fitting terra cotta collar and boiler putty or fireproof cement.

No wood should be within 12 inches of the connection or any part of the smoke pipe. If a

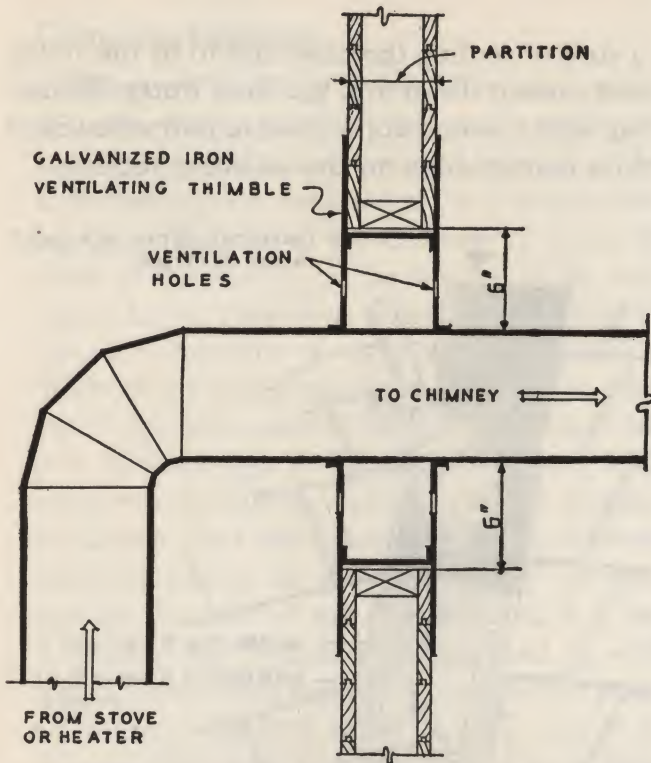


Fig. 20—How to pass a stove pipe through a wall.

smoke pipe must be carried through a wood partition, the woodwork should be protected by

cutting a hole in the wall 12 inches larger than the diameter of the pipe and passing it through a double wall metal ventilating thimble as shown in figure 20.

Smoke pipes should not pass through floors, closets, or concealed spaces.

All smoke pipes should be cleaned at least once a year.

5. Chimney Insulation:

Wood studding, furring, or wood lath should not be placed against the chimney but placed back from the chimney as indicated in figure 21.

If the chimney is to be encased in a wooden partition it should always be coated with cement plaster and all wooden construction adjacent to the chimney should be insulated with 2 inches of fireproof insulation between the outside face of the chimney and the wooden framing members. Likewise baseboards fastened to plaster applied directly to a chimney should be protected by placing a layer of fireproof material at least one-eighth inch thick between the woodwork and the plaster.

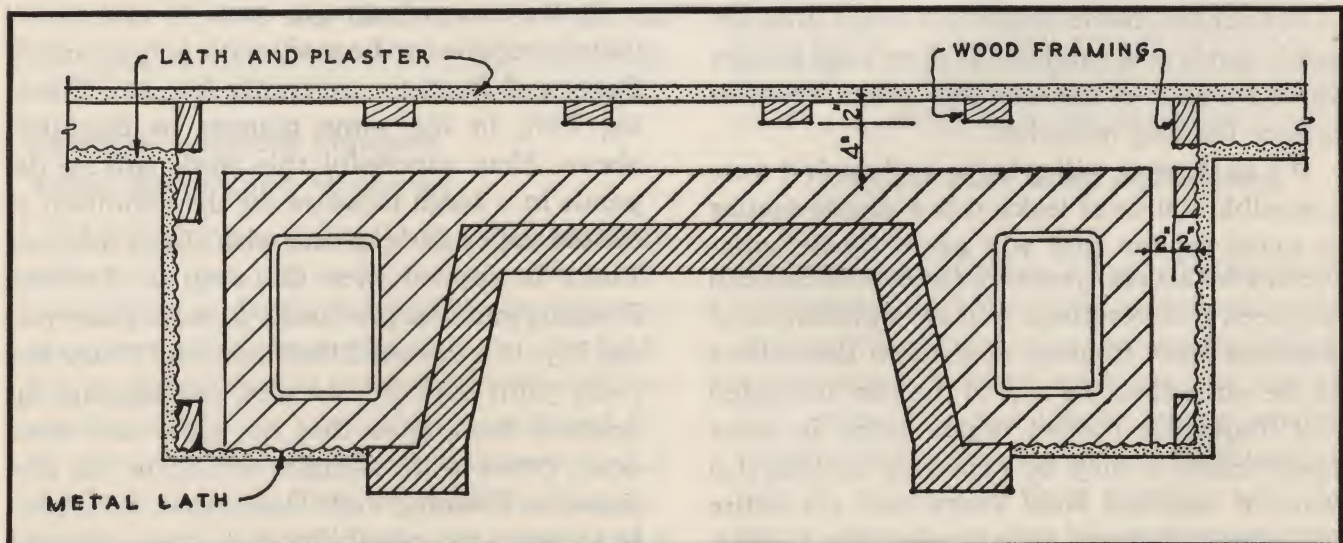


Fig. 21—Fire safe construction around chimney and fireplace.

HOW TO REPAIR AND REBUILD WORN OUT FLASHINGS

Winter snows and spring rains will show up the weak spots in farm roofs. Reroofing and patching is the obvious answer to many of these problems, but exasperating leaks in what seem to be perfectly good roofs are most frequently caused by the flashing. The flashing materials may be rusted through, cracked or improperly applied. In any event, it is a good idea to look here for leaks first.

Flashing, which is usually sheet metal protection, occurs where one roof surface intersects another to form a valley, at gutters, and where parts of a building project through the regular roof surface, such as dormers, chimneys and vents. In the past, farm flashings have been made of tin, zinc, lead, or copper because these materials were easily available. Copper, however has generally been considered the most satisfactory flashing for farm buildings but near industrial areas it was found that 20 ounce copper was needed to give good service due to the fumes in the air.

Asbestos flashings have been generally used in industrial areas especially for factory work where the higher degree of protection was required. This material has not been available to the general home owner or farmer until recently but is now available at most local lumber yards because of the shortage which exists in copper flashing materials.

If a flashing or valley looks as though it were a possible source of leaks, it is a simple matter to make repairs that will generally be satisfactory for several years. In the case of Smooth Surfaced Roll Roofings, a heavy application of Asbestos Roof Coating applied on the valleys at the same time the rest of the roof is treated will frequently correct minor leaks. In more severe cases it may be necessary to trowel a layer of Asbestos Roof Putty over the entire valley well up beyond the overlapping roofing. If there are any actual holes in the valley, cut

a strip of roofing the exact size to fit the valley and press it down into the Roof Putty, following with a second application of putty trowelled to a feather edge on the adjacent roofing.

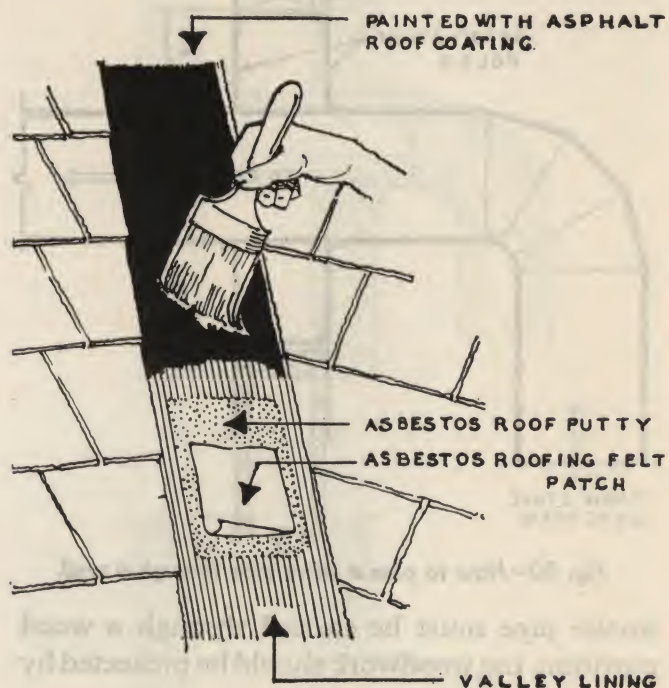


Fig. 22.

In the case of shingle roofs having metal valleys, repairs can be made with Asbestos Roof Putty and Roofing, preferably Asbestos Flashing Felt, in the same manner as described above. How successful this work will be depends in a large measure on the condition of the old valley and the care with which the Roof Putty is applied over the strip of Asbestos Flashing material previously fitted in place (see fig. 22). It is essential that this Roof Putty seal every joint between shingles, overlapping the original flashing so that no water can work down between the shingles and under the new Asbestos Flashing Felt. Remember, the object is to leave no possibility for water draining down the roof to work under the exposed sur-

face of the valley but, on the contrary, make it flow over and on top of the new surface.

Chimney Flashing

Chimney flashings frequently are a source of leaks that run down the roof rafters and show up some distance away. Again remember that flashings are designed to divert water flowing down the side of the chimney or down the slope of the roof on to the surface of the roofing material. Therefore, examine your flashings for any possibility of water getting behind or under the flashing and, hence, under the roofing. If you have a metal flashing, make sure that it is secured tight to the chimney. Any loose mortar in the chimney adjacent to the flashings should be filled with Roof Putty. The flashing material should be fastened tightly in place against the side of the chimney and if it has worked loose, it should be tightened up with wedges inserted in the mortar or nailed in place. Of course, wherever a nail is used it must be covered with Roof Putty. In fact, after making certain that the flashing material is securely held in place, apply one or preferably two heavy trowellings of Asbestos Roof Putty so that the entire flashing is completely covered with the Roof Putty extending up the side of the chimney above the flashing and out on the roofing material beyond the flashing. Wherever the Roof Putty stops, trowel it to a feather edge.

Remove Adjacent Shingles When Rebuilding Flashings

If a flashing or valley is so badly corroded with numerous pits or holes that it should be completely replaced, the old shingles adjacent thereto must be removed so that the new flashing or valley can be worked into the shingle construction. This is a rather complicated job to do successfully. It stands to reason that if the flashings are so badly worn, the roofing material as well is probably on its last legs and a complete reroofing job is advisable along with

new flashings and valleys, all of which will be applied right over the existing roofing and flashing surfaces. This reroofing should be seriously considered at such a time, for extensive repairs in an endeavor to replace flashings and valleys may prove expensive and not thoroughly satisfactory.

In the case of such a reroofing job, the use of Asbestos Flashing Felts is recommended in place of metal which is no longer available. Many years of experience in large industrial operations has proved the long life and satisfactory service of this material. Figures 23, 24 and 25 illustrate the construction of valleys and

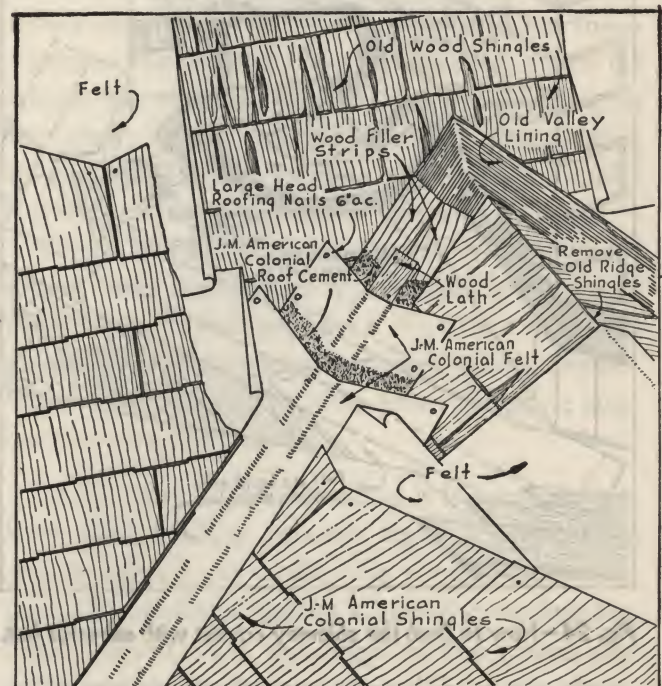


Fig. 23 - Valley flashing when re-roofing.

flashings in such cases. Old open valleys should be levelled out by installing continuous wood strips of the same thickness as existing shingles to provide a smooth solid base for the felt. Use continuous full length linings wherever possible. Should piecing be unavoidable, lap the felts 6" and cement them together with Roof Putty. Always lay the felt so the water runs over the laps, never against exposed edges. First

REPAIRS TO FLASHINGS

apply the Roof Putty to the old surface, spreading to uniform thickness of approximately $\frac{1}{8}$ ". Then cut the first layer of felt not less than 12" wide and lay directly over the old valley and adjacent roof surfaces, carefully forming into angles and nailing at edges on not more than 6" centers. Apply another layer of Roof Putty and then the second layer of felt not less than 20" wide should be embedded into the putty and nailed at the edges on not more than 6" centers.

When flashing masonry chimneys, it is de-

sirable first to apply a brush coat of concrete primer so as to insure good adhesion of the Roof Putty. Cut strips of Asbestos Flashing Felt as indicated in the drawings and always work from the lower side of the chimney toward the upper side, applying the felt so that the water will always drain over the laps. The final step, of course, is to apply the roof covering over that part of the flashing extending out on to the roof, all in keeping with the theory of having the water run over the laps.

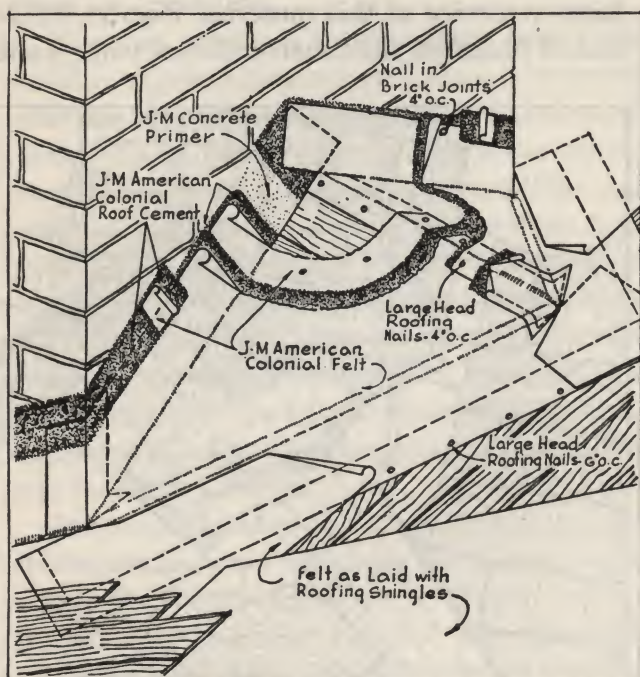


Fig. 24 - How to flash the chimney cricket with asbestos felt.

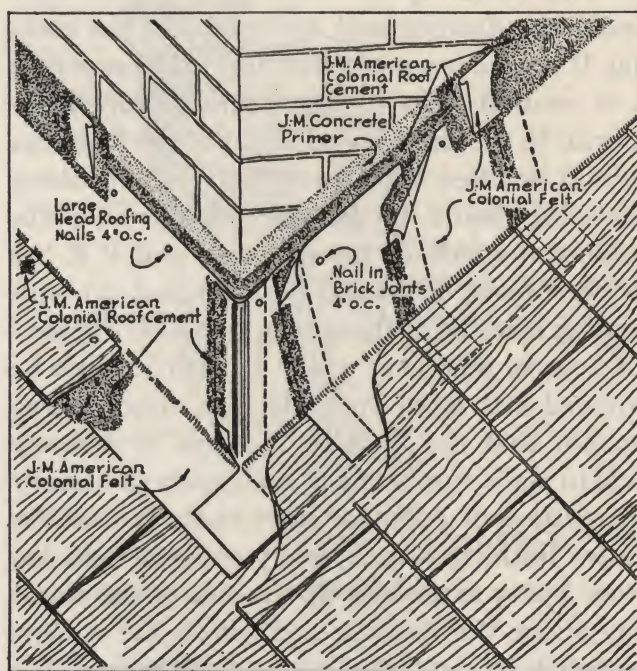


Fig. 25 - How to properly apply the asbestos chimney flashing.

Your local building material dealer can keep you informed on the availability of critical materials in your area. He also carries in stock a good selection of non-critical materials that can be used in making essential repairs on your farm.

REPAIRS TO ROOF COVERINGS THAT WILL EXTEND THE LIFE OF YOUR BUILDINGS

As no part of a structure is of greater importance than the roof of a farm building, it should be maintained watertight at all times. War requirements make this a patriotic duty but it is also sound business practice.

Leaking roofs frequently destroy a year's harvest and spontaneous combustion fires caused by leaks have in numerous instances caused the destruction not only of the crops but the stock, equipment and buildings as well. Roof repairs are too often neglected. Small defects that can be readily repaired if done promptly are too often permitted to remain neglected, causing damage to the building and contents, as well as threatening the life of the roofing material itself.

Periodic inspections will disclose such small defects and are well worth the trouble involved.

Here are some suggestions for such inspections, maintenance and repair.

Always use a ladder or plank chicken-ladder secured over the ridge when inspecting or repairing sloped roofs (See Figure 26). First of

all, be sure that ladders and other scaffolding equipment are substantial and firmly secured. This will make climbing easier and safer and at the same time protect the roofing material which is too often damaged by walking on it.

Leaks are often difficult to locate but an examination of the wet spots on the upper interior parts of the structure will furnish a clue as to their probable location. Frequently, the drip from a leak will appear much lower down the roof slope than the actual leak due to water following down the rafters. Again in northern climates the trouble may be due to snow or ice which has piled up higher than the flashing on the upper side of chimneys or ice accumulating on the eaves which forms a ridge causing melting snow to back up under the roof shingles.

There comes a time in the life of every roof when leaks become so numerous that there is nothing to do but replace it, but that time can generally be postponed by locating and repairing the actual hole or leak. Here are some suggestions to that end.

In the case of Roll Roofing it is most important that nailing remain tight so that high winds cannot get under the roofing and start tears. First check nailing where the roofing has been turned over the edge of the eaves and gable ends to make sure that all is secure there. Then check the nailing along the laps, redriving any nails that are worked loose or have been drawn by the sun. Put in new nails where necessary and then watch the roofing during wind storms to observe the action of the force of the wind in order to locate potential weak spots or breaks. On buildings where roof boards have shrunk due to summer heat, leaving spaces between the boards, you can often watch the effect of gusts of wind blowing through a large open door and on up through the cracks

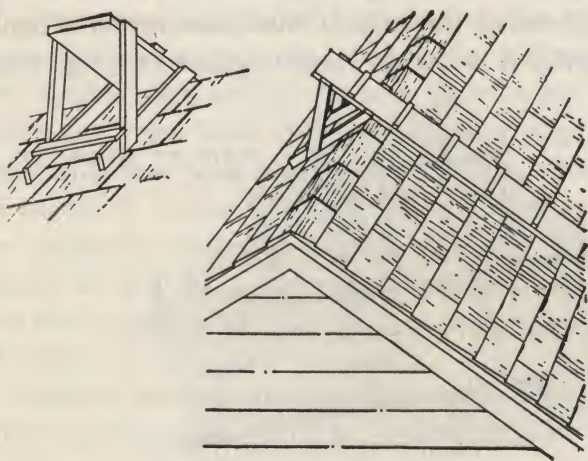


Fig. 26 - How to build a chicken ladder for roof repair work.

in the roof boards, lifting the roofing up and down with the gust of wind. Every such lift is a pull at the nails and is bound to cause trouble if allowed to continue. The most immediate correction is to keep the doors and windows closed in such weather. In severe cases it may be necessary to line the underside of the roof because roofing of this kind cannot be expected to last unless applied over a tight, closely fitted roof deck.

Inspect all the laps, making sure that they are not only well nailed but well cemented. In some cases it may be advisable to coat the laps and nail lines with Asbestos Roof Putty or Asbestos Roof Coating (See Figure 27). Fur-

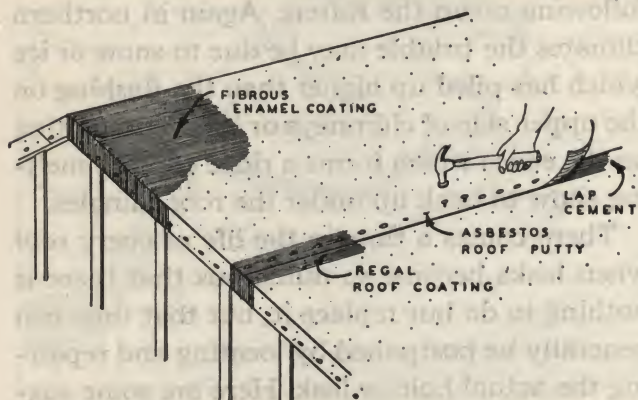


Fig. 27—On roll roofing, renail loose nails, putty old nail holes. Coat old roofing with fibrous enamel to increase its life.

thermore, as the sun tends to dry out Roll Roofing over a period of years, an application of Asbestos Roof Coating will resaturate and renew the life of the roofing, thus prolonging its serviceability many years.

Where metal roofs are riddled with small pin holes due to rust, the serviceability can be extended many years by heavy application of Asbestos Roof Coating. Larger holes or heavily corroded spots should be patched with a piece of Roll Roofing Saturated Felt cemented to the metal roofing with Asbestos Roof Putty, followed by a trowelled coating of roof putty over the whole patch which is trowelled to a feather edge.

On wood shingled roofs, the corners of badly curled shingles should be nailed flat and the

heads of these exposed nails covered with Asbestos Roof Putty. Rotted or missing shingles should be replaced. In removing a defective shingle, the securing nails should be cut by inserting a nail-ripper or long thin chisel under the shingle with the cutting edge against the nail and striking the exposed end of the ripper or chisel with a hammer. Care should be taken

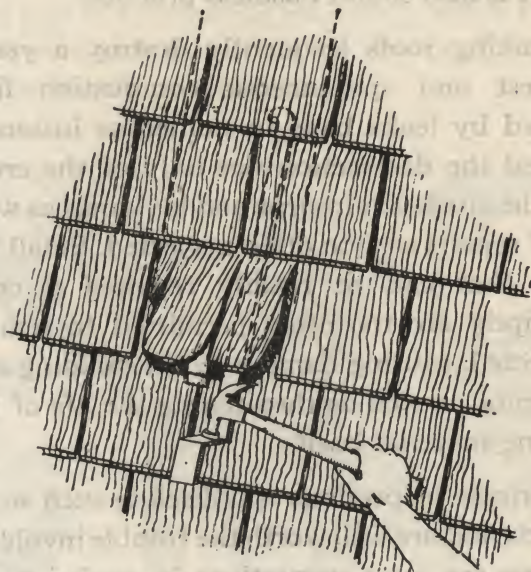


Fig. 28—Using a nail ripper to remove an old shingle.

not to dislodge or loosen adjoining sound shingles. Replacement shingles are secured by driving a nail through the joint between the covering shingle. After the nail has been driven, slip a small piece of sheet metal under the covering or overlaying shingles so that it will cover the head of the nail. If this sheet metal is bent slightly it will hold itself in place (see fig. 29).

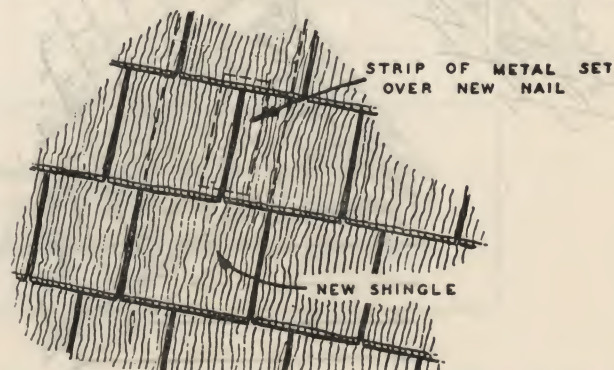


Fig. 29—Showing where to place sheet metal to cover nail on replaced shingle.

One nail is usually sufficient to secure the new shingle. If wood shingles are not available, an equally satisfactory repair can be made by inserting a piece of Asphalt Roll Roofing large enough to cover the defective unit under the existing shingles and secure in place with Roof Putty inserted between the butt edges of the shingles and felt. (See Figure 30).

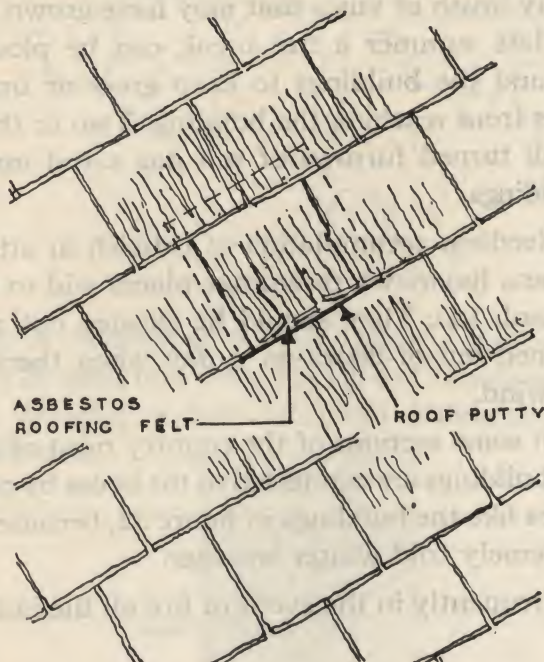


Fig. 30 - How to repair defective wood roofs with asphalt or asbestos felt.

On slate roofs a cracked or broken piece of slate can be replaced in the same manner as described above for a wood shingle roof except that the new slate should be held in place by a strip of sheet metal, the latter being nailed to the roof boards before the new slate is put in place and then bent up over the lower edge to hold it. If new slate is not available, use a piece of metal or Asphalt Roll Roofing and always be generous with the use of Asbestos Roof Putty on any suspicious spot where cracks in the slate may permit the leakage of water over the head of the underlying slate.

Gutters should be observed to see whether they have sagged and, if so, brace them up so water will drain to the downspout outlets. Don't let your gutters become choked by leaves

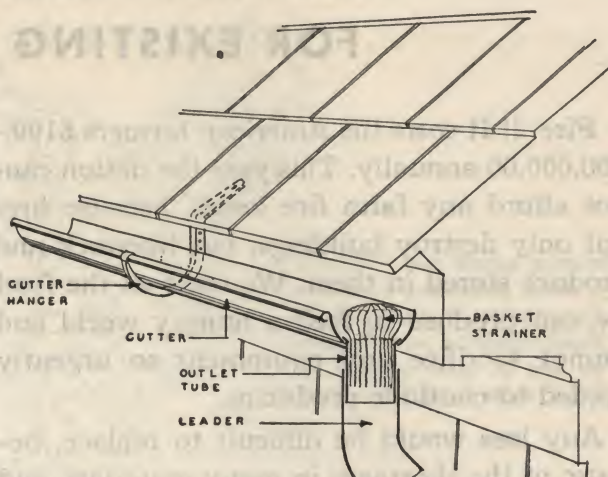


Fig. 31 - A defective hanger may cause gutters and downspouts to sag. Replace with a new one. Use a basket strainer at the outlet to prevent clogging.

or other refuse. This refuse not only obstructs the flow of water but also induces and accelerates corrosion of the lining material or metal of which the gutters are made. Sometimes, a choked and overflowing gutter may spill water against a building in such quantities as to find its way through the side walls into the building interior. Leaky gutters can easily be repaired by applying a trowelling of Asbestos Roof Putty to the inside, overlaying that with a strip of Roll Roofing cut to size and fitted in place.

As mentioned earlier in this article, there always comes a time in the life of every roof when it is so worn out that further patching and repairs are of little avail. New leaks occur as fast as the old ones are fixed and the only sensible thing to do is to replace it entirely. The application of Roll Roofing over an old roof of this material is a simple problem with which most farmers are familiar. Likewise, the application of Asphalt Strip Shingles over old Wood Shingles is a simple operation that most any man can do if he is at all handy with tools. Recently a new type of Asbestos Cement Strip Shingle has been developed which is as simple and easy to apply as any Asphalt Strip Shingle. For further details see page 34.

FIRE STOPS AND FIRE PROTECTION FOR EXISTING FARM BUILDINGS

Fire !! It costs the American farmers \$100,000,000.00 annually. This year the nation cannot afford any farm fire losses, because fires not only destroy buildings, but livestock and produce stored in them. We need all the food we can produce to feed a hungry world and cannot sacrifice any equipment so urgently needed to continue producing.

Any loss would be difficult to replace, because of the shortages in many materials, and it will take years to replace any livestock that may be destroyed. So it becomes the duty of all of us charged with the production of food, to take more than ordinary precautions to prevent fires. There are many things that we can do quickly and inexpensively that will guard against fire.

The following check list will act as a guide to help start checking the danger points:

1. Location of Buildings:

There is little that most of us can do about

this as we already have most of the buildings we require and it is uneconomical to move the structures. However, there are a few simple things that we can do. We can clean up around the buildings to remove fire hazards, clearing away brush or vines that may have grown up. In late summer a fire break can be plowed around the buildings to keep grass or brush fires from reaching the building. Two or three fresh turned furrows of soil has saved many buildings.

Needless accumulation of rubbish in attics, cellars, haymows, or storage places add to the hazard, too. They should be cleaned out and burned out-of-doors on a day when there is no wind.

In some sections of the country most of the outbuildings are connected to the house by passages like the buildings in figure 32, because of extremely cold winter weather.

Frequently in the event of fire all the build-



Fig 32 - In this typical Northeastern farm group fire protection can be provided by constructing a fire wall at the points indicated by heavy broken lines.

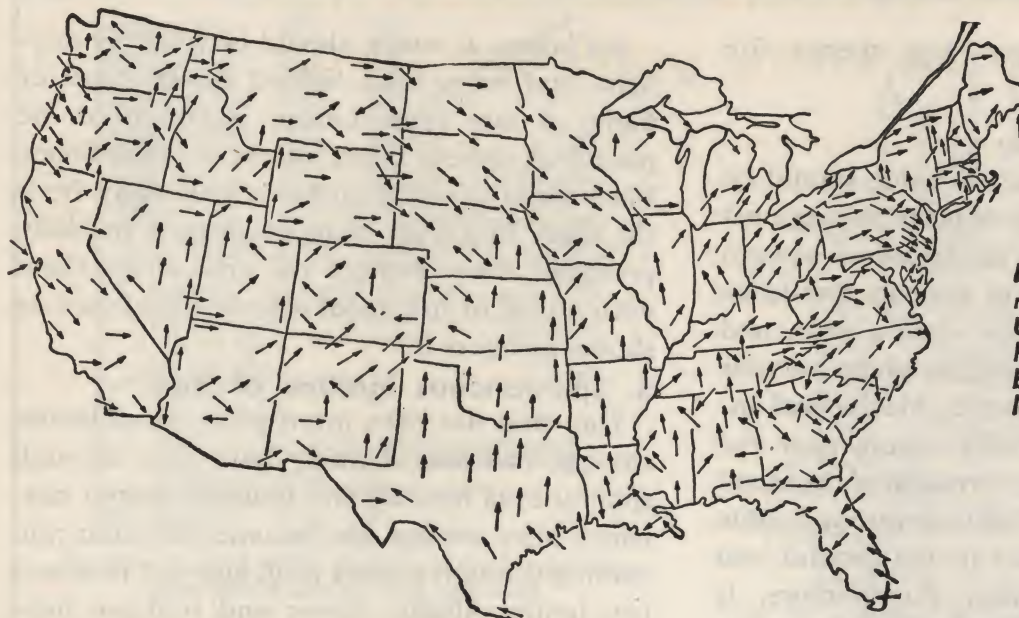


Fig. 33 — Map shows general direction of prevailing winds in the U. S. To avoid unnecessary fire hazard, new buildings should not be located close to and on the leeward side of other buildings.

ings are destroyed. A large degree of protection can be built into even this type of arrangement by building a few fire-proof bulkheads, as indicated.

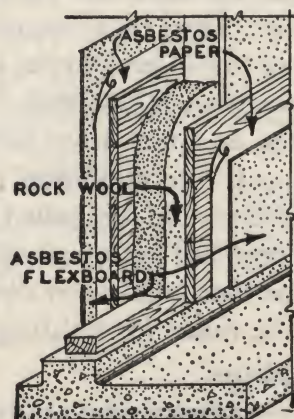


Fig. 34 — Section through Fire Wall.

The bulkhead is a wood partition extending through the roof, filled with fire-proof rock-wool insulation and faced on both sides with flat sheets of 3/16" asbestos flexboard, or asbestos siding shingles.

A separate building should be provided for highly combustible material, such as paints, gasoline, kerosene, etc. This building should be at least 150 feet from the other buildings. It should be built of reinforced concrete, or asbestos products. In the event of fire, the blaze will then be confined to this building and will not endanger the other structures.

When it is necessary to re-side farm buildings, asbestos siding shingles will give you the fire protection you need, and will provide lasting good appearance, without the usual maintenance expense.

2. Roofing:

A substantial roof of asbestos, slate, mineral surfaced asphalt shingles, or some other non-combustible, fire-resistant or fire-retardant roof covering adds materially to safety from fire. It lessens the possibility of fire sweeping from roof to roof by means of burning brands. It also reduces the hazard of fire from chimney sparks.

When chimneys are located in farm buildings it is necessary that the flues be kept clear of accumulations of soot, and that they be maintained in good condition, as described in the chapter, "Hints on Chimney Repairs."

Spark arrestors should be provided on all chimneys, especially if the roof covering is made of a combustible material.

The fire hazard is greatly increased when wooden shingles are old, frayed and warped. Roofs of other non-fireproof materials, when in poor repair also increase the danger of fire. Roofs that are in this condition, especially on buildings with chimneys, should be replaced or recovered not only to give renewed weather

protection, but to remove this special fire hazard.

3. Lightning Protection:

No building of substantial value should be without a standard system of protection against lightning. But installing an approved system is not enough... lightning systems should be carefully inspected at least once a year, and particular attention should be given to rods where they enter the ground. Mechanical injury to the rods frequently occurs near the ground and it is here that corrosion of the metal is most likely to occur. The underground cable should be well embedded in the ground and should be packed tightly. Furthermore, it should extend down to moist ground to be effective. For location of lightning rods and details on installation consult page 12 in "The Farm Idea Book," also published by Johns-Manville.

4. Lamps:

Oil lamps still continue to be the most common source of light on farms. Those intended to stand on desks or tables should have a wide base so that they will not tip easily. A metal lamp is safer than one made of glass, in that if it should fall accidentally or be dropped, it will not break and flood the floor with burning oil.

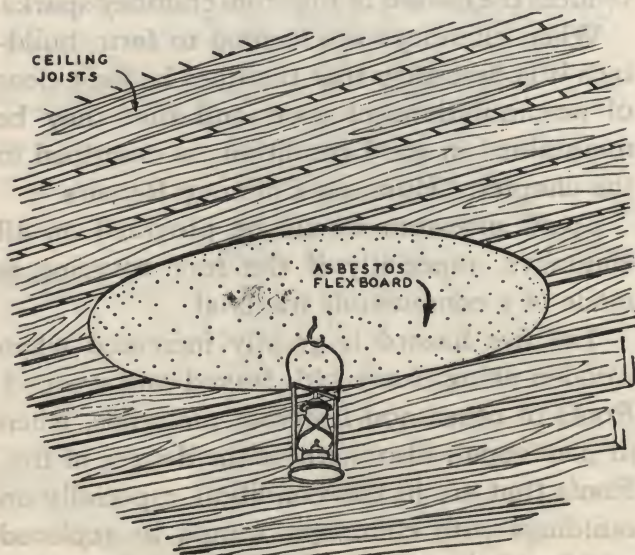


Fig. 35 - A safe fireproof shield for use over a lantern.

All lamps or stoves should be filled by daylight, and away from lighted stoves, pipes or flame of any type. Lamps should never be placed on rickety boxes, stools, or barn floors. Place them on solid surfaces well away from the edge. In a barn, hang them on a specially provided hook. Protect the area above them with a disk of fire-proof asbestos flexboard as shown in figure 3.

5. Spontaneous Ignition of Hay:

Hay that has been improperly cured before storage, has caused many barn fires through spontaneous heating and ignition. Cured hay, which after storage has become wet from rain coming through a leaky roof, also will heat and can ignite. Alfalfa, clover and soybean hays with heavy stems are most likely to heat and cause fires.

The solution is not to store improperly cured hay in the barn and to keep a tight roof on the barn at all times. This, plus frequent examinations of the hay for several weeks after storage to learn its condition is essential. "Steaming," irritating odors, and wet areas in the hay are danger signals. If the condition continues, a fire department should be called for help in removing the hay, but before moving it the hot areas should be thoroughly wet down and provision should be made for fighting a fire.

6. Fire Stopping:

Open spaces between the studs of a frame wall, between the furring strips of a furred masonry wall, and between the floor joists act like a chimney when a fire gets into them. Fire spreads quickly through a building in this way. To prevent or retard the spread of fire, these spaces should be filled with fire-proof rock wool insulation and fire stopping should be used, as illustrated in the drawings on the following page. Many farmers have protected their buildings by completely filling all exterior hollow walls with rock wool. This gives them the comfort and fuel saving benefits of insulation and excellent fire protection at the same time.

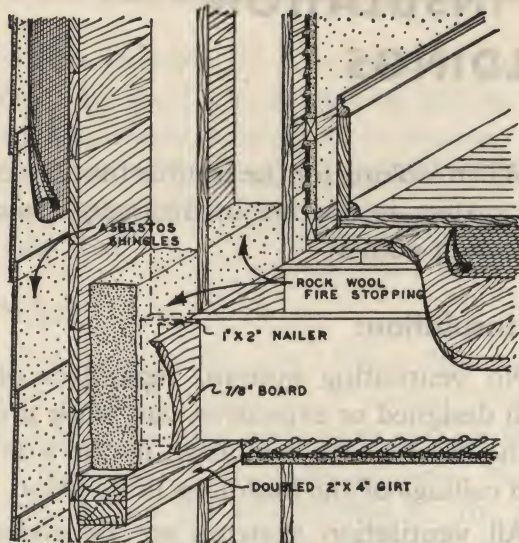


Fig. 36 - Method of fire stopping at the second story level with double girt and rock wool.

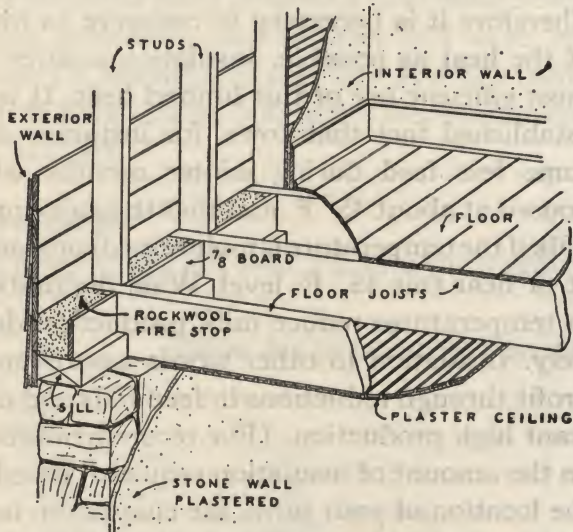


Fig. 37 - Method of fire stopping at the sill line with rock wool.

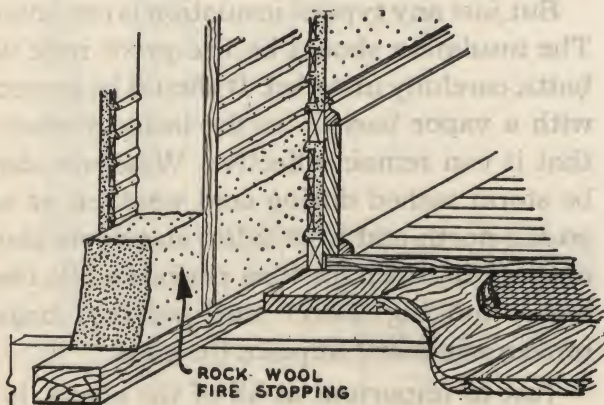


Fig. 38 - Fire stopping at base of a non-load bearing partition.

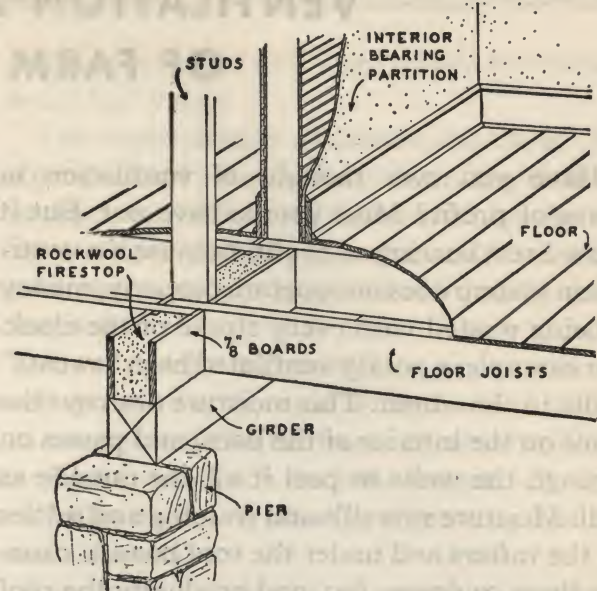


Fig. 39 - Method of stopping a bearing partition supported by a girder or pier.

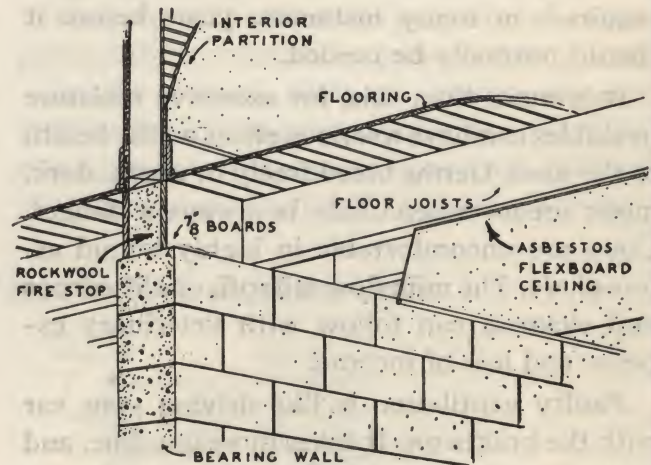


Fig. 40 - Method of fire stopping a bearing partition set on a wall. Note Asbestos Flexboard ceiling for added fire safety.

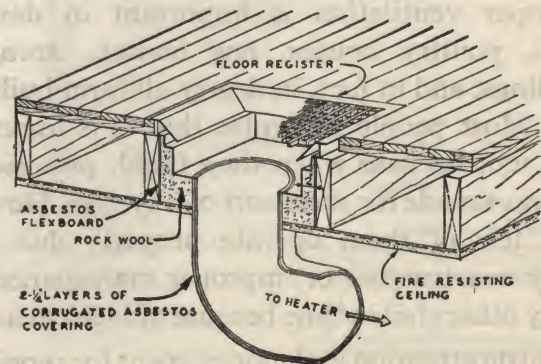


Fig. 41 - The proper way to install and fireproof a floor register.

VENTILATION AND INSULATION OF FARM BUILDINGS

Have you ever thought of ventilation in terms of profit? Most people have not. But it has a direct bearing on profit, because if a ventilation system does not operate properly, money is being wasted with every stroke of the clock. For example, a poorly ventilated barn "sweats" badly in the winter. This moisture destroys the paint on the interior of the barn, and passes on through the walls to peel it off the outside as well. Moisture rots sills and framing and settles on the rafters and under the roof boards, causing them to decay, too, and gradually the roof sags. The life of most roofing materials is reduced by this moisture and new roofing is required, in many instances, years before it should normally be needed.

It is more than this, for excessive moisture in stables can have a serious effect on the health of the herd. Germs breed freely in warm, dark, moist areas—tuberculosis is always a danger. Cows are uncomfortable in highly humid atmosphere. The milk flow falls off, vitality drops and sickness can follow with veterinary expense and loss of income.

Faulty ventilation is like driving your car with the brakes on. It takes more gasoline, and at the same time you are burning up the lining, damaging the drums, putting extra wear on the motor and courting disaster from a fire.

Proper ventilation is important in dairy barns, poultry houses, hog houses, storage buildings, and in fact, in nearly all farm buildings. Most people recognize that it is important, too, because when they build, provision is always made for some sort of a system. However, few of them operate properly due to faulty construction or improper management. Many others fail in time because of lack of care.

A little attention and money spent for repairs would make most faulty ventilation systems operate satisfactorily.

When looking for the trouble that has caused the system to operate ineffectively, check the following points:

1. Insulation:

No ventilating system, regardless of how well designed or expensive, can work properly without adequate insulation in the side walls and ceilings of the buildings in question.

All ventilation systems are dependent on heat for proper operation. This heat in most instances must be body heat from the animals. Therefore it is necessary to conserve as much of the heat as possible. Insulation assures the most efficient use of this limited heat. It is an established fact that cows, for instance, consume less feed during winter months when housed at about 45° F. and that they give more milk if the temperature is maintained constantly at or near this 45° F. level. Wide fluctuations in temperatures reduce milk production drastically. Insulation in other words assures more profit through reductions in feed bills and constant high production. (For recommendations on the amount of insulation required, based on the location of your farm, see chapter on insulation in the Farm Idea Book published by Johns-Manville.)

But just any type of insulation is not enough. The insulation should be fire-proof rock wool batts, carefully installed. It should be protected with a vapor barrier on the inside surface, so that it can remain effective. Windows should be storm sashed during cold weather, at least on the north and west sides, and doors should not be kept open for long periods while cleaning or milking. Don't stuff old feed bags in broken windows! Replace the glass.

Just as important as all of the above, is the manner in which you use your barn. Keep the number of animals quartered in the barn as

constant as possible. If it is designed for 20 milking cows, 4 calves, and 5 young heifers, try to keep that many animals in it, because the design of the ventilating system depends on the heat produced by that number of animals, to be effective.

2. Intakes:

Are the intake units open? Often they function only partially, because of obstructions in the flue. The grill may be broken and birds or rodents may have built nests in them; brush may have grown up and matted on the entrance, or cordwood, lumber or a load of sand may be piled against others.

Perhaps the draft deflectors have been closed during extremely cold weather and were left closed. Or, the intake valve that acts as a baffle against back drafts, may have become broken and is stuck.

3. Exhausts:

If electric fans are used, perhaps the thermo-

stats are out of order. They should be checked every few years.

The accumulation of dirt on the blades and other parts of a fan will cut down its efficiency as much as 20%. All fans should be cleaned twice a year at least, but care must be taken not to get water in the motor or you will short-circuit it.

Water which condenses during the winter on cold louver blades, used as back draft baffles on most fans, will often freeze them shut. When they are frozen shut the exhaust will not work until the warm air blown on them by the fan melts the ice.

Excessive weight of these same louvers, either in themselves or because of ice can cut the fan delivery excessively.

Care should be taken to properly select and protect these exhausts to prevent this trouble.

In the natural draft or gravity systems, where electricity is not available, most troubles come from the flue construction itself. All flues should be well insulated to work effectively

How to properly construct intake and exhaust units

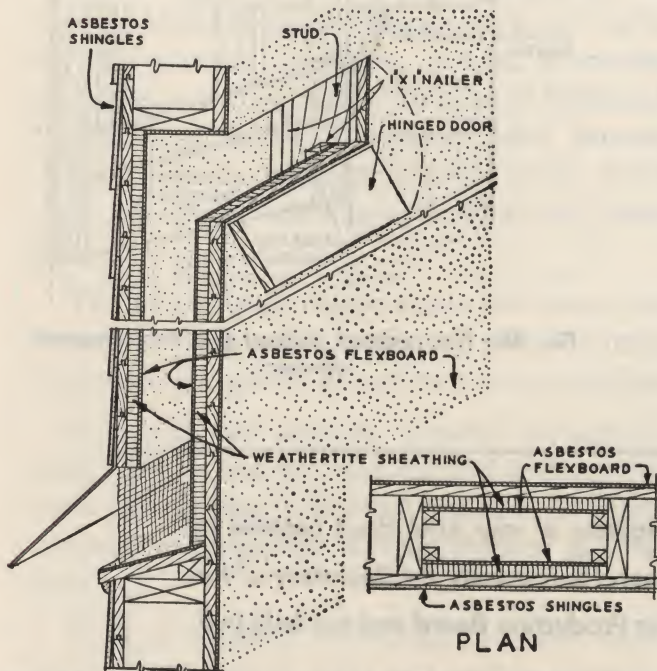


Fig. 42 - Construction of natural draft intake ventilator when interior of barn is solid sheathing.

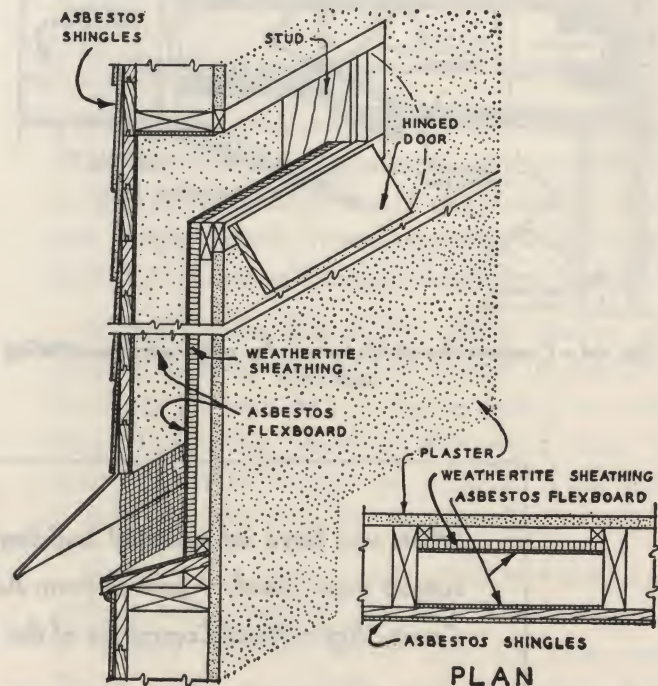


Fig. 43 - Construction of natural draft intake ventilator when interior of barn is cement plaster.

VENTILATION AND INSULATION

and of course they must be connected to the exhaust monitor. This may sound ridiculous but often the reports of extension workers, as a result of their inspection, indicate that the flues either were never connected or were connected carelessly without proper supports. When they sagged, the flues opened up.

Flues should be as straight as possible, too. Sharp bends should be avoided as they reduce the capacity of the flue. During fires, flues are very dangerous, because they act like chimneys and spread fire rapidly. All flues should be equipped with fire-proof dampers that can be closed quickly. The interior lining of the flue should be fire-proof, too. Many farmers are using a flue built of insulating board and fire-proof asbestos flexboard, like the one illustrated in the following drawings.

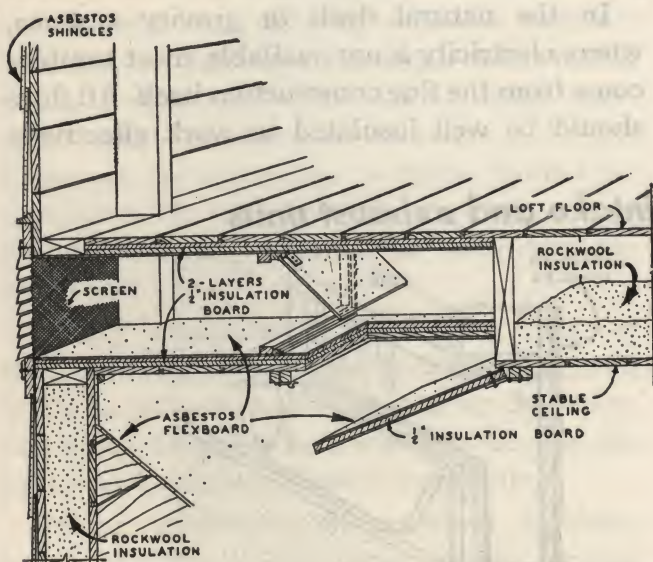


Fig. 44 - Construction of intake unit for mechanical ventilating systems.

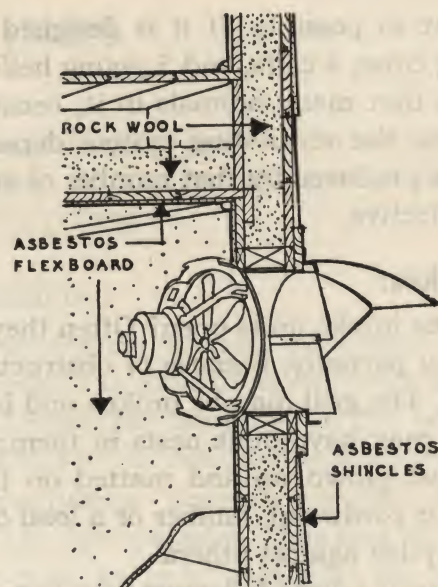


Fig. 45 - The construction of exhaust unit when electric exhaust fan is used.

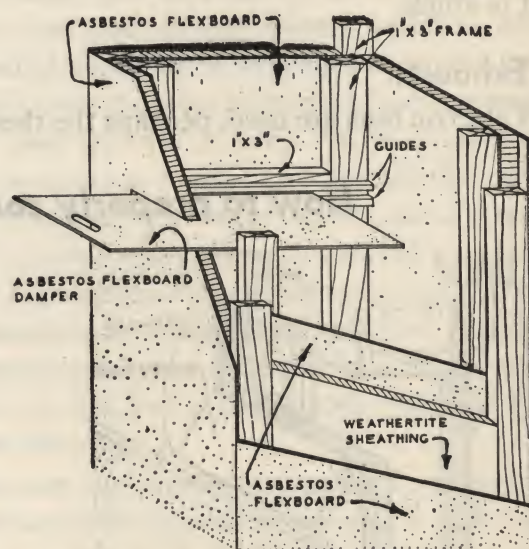


Fig. 46 - Fire resistant exhaust flue with fireproof damper.

When you have an essential building problem of any kind don't hesitate to consult your County Agent or Farm Adviser. He is usually the Secretary of the County Agricultural Committee of the War Production Board and can help you.

EFFECTIVE PROTECTION AGAINST RODENTS ON THE FARM

Rodents damage buildings, carry disease, eat feed and grain and kill baby chicks. They are thieves that not only steal your profits but make it necessary to spend many extra hours doing the regular routine work.

With labor shortages and high prices for farm goods, this becomes an ideal time to eliminate this problem. Past research by government agencies has shown how these pests can be controlled, even in badly infested areas. The cost of rat-proofing the average farm is not great and often will amount to less than a single year's loss.

To stretch your labor, so you can produce more and to protect what you have produced, include rodent-proofing as an early task on your must list.

There are a few general rules to help eliminate the breeding places and food supplies, so that rats will be discouraged from setting permanent colonies. Rat breeding places are usually beneath wooden floors, set a few inches off the ground, in barns, stables, corncribs, granaries, poultry houses; in piles of fuelwood, lumber, and refuse; in manure piles, beneath concrete floors without curtain walls, inside double walls of buildings and in hay and straw piles.

The first step in rat-proofing the farm, is to clean up the possible harboring places outside and then pay special attention to each building.

First you will want to consider an incinerator, for burning all trash, as well as deep covered pits to take non-combustibles. A tightly covered garbage can for the kitchen is a big help.

Piles of lumber, cordwood, or other materials which would offer a possible breeding place should be kept off the ground, preferably

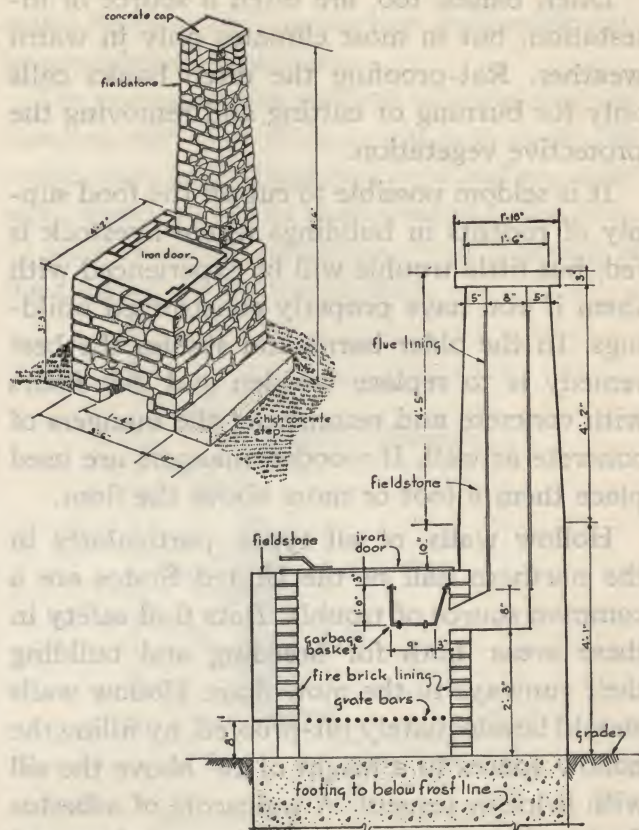


Fig. 47 - A practical, home-made incinerator.

on masonry platforms at least 18 inches high. If wooden platforms are used, rat shields should be placed around the legs of the platform. These are easily made from discarded galvanized metal, or sheets of asbestos flexboard (page 35).

Manure piles and hay or straw stacks, near sources of food should not be left undisturbed for long periods. It is a better policy to move these harboring places as far away from the source of food supply as possible. This alone will frequently remedy the situation.

Stone walls, improperly chinked furnish excellent harborage for rats, but like wood piles, it is only common when they are near food. Stone walls supporting embankments, however, are frequently infested, if they contain

RODENT PROTECTION

loose stones. Closing openings and chinking loose stones is all that is required to cure this condition.

Ditch banks, too, are often a source of infestation, but in most climates only in warm weather. Rat-proofing the ditch banks calls only for burning or cutting and removing the protective vegetation.

It is seldom possible to cut off the food supply of rodents in buildings where livestock is fed, but little trouble will be experienced with them if you have properly constructed buildings. In the older barns and stables the best remedy is to replace wooden and dirt floors with concrete and reconstruct the mangers of concrete as well. If wooden mangers are used place them a foot or more above the floor.

Hollow walls, of all types, particularly in the northern half of the United States are a common source of trouble. Rats find safety in these areas, both for breeding and building their runways to the mow floor. Hollow walls should be adequately rat-proofed, by filling the hollow spaces to a height of 10" above the sill with brick or cement. A wainscote of asbestos flexboard two to four feet high, carried around the inside wall just above the sill, will give ideal protection.

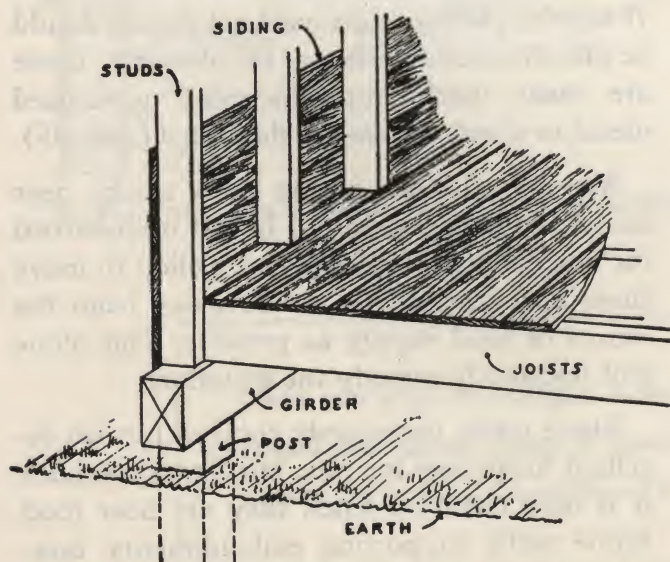


Fig. 48—Typical old barn with wood floor before rat-proofing.

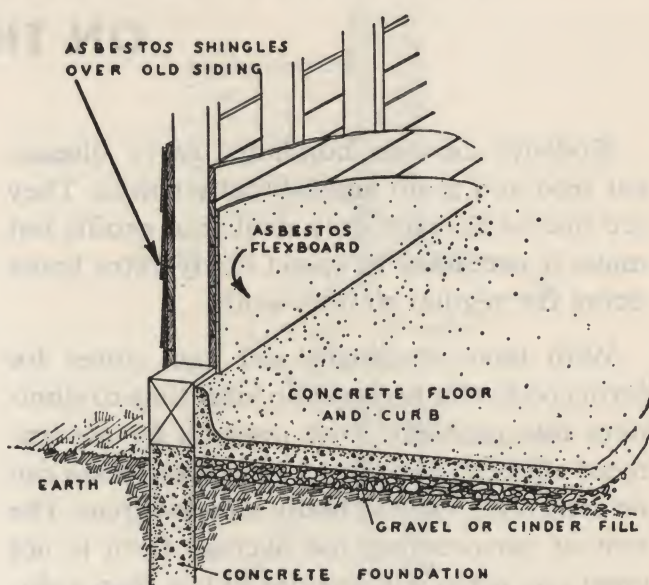


Fig. 49—Same barn after rat-proofing with concrete floor.

How to rat-proof an old barn with wooden floors, supported a few inches above the ground on girders and posts is illustrated here. Figure 48 shows detail of the old barn and Figure 49 the same barn after it has been rat-proofed with cement and asbestos.

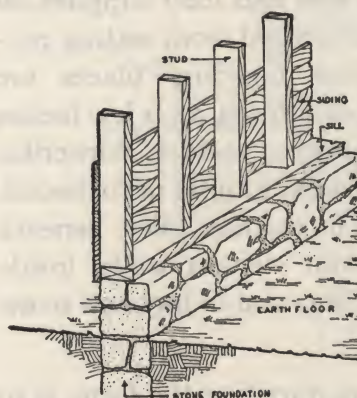


Fig. 50—Old barn with earth floor before rat-proofing.

Raising the floor level with a cinder or gravel fill and providing a concrete floor will solve the usual problem. The wainscote of asbestos flexboard will prevent access by rats to spaces between the studs and provide better sanitary conditions behind the stock.

The haymow is considered a difficult problem by most farmers who have heavily infested barns, but the haymow is seldom responsible for the rats. If all other rat harbors in the barn are shut off, the rats will not remain long.

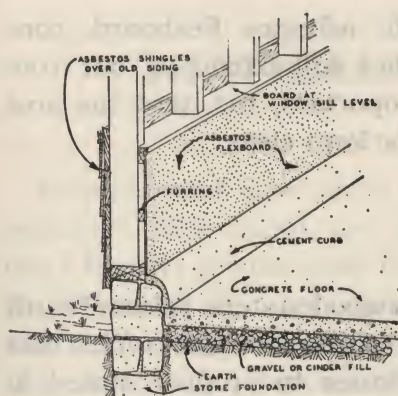


Fig. 51—Same barn after rat-proofing with cement and asbestos.

Re-siding with asbestos shingles or placing an 8" band of asbestos flexboard around the outside of the building, will prevent rats from climbing up the corners, to find an entrance at the gable end ventilator or under the eaves. Closing hollow wall passageways as suggested before and constructing feed bins of rat-proof materials, designed so that there is no hiding places for rats under or behind them like in Figure 52 will help clear out the rodents.

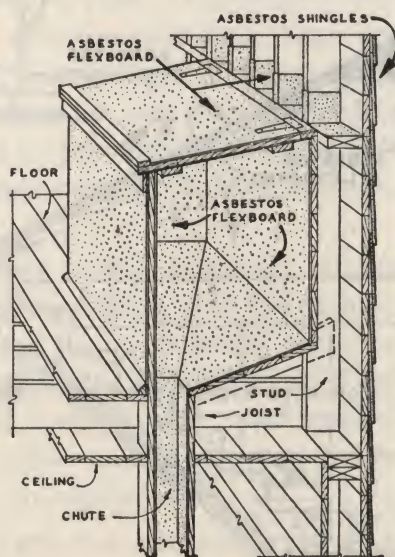


Fig. 52—A rat-proof grain bin built of asbestos flexboard.

The grain bin should be completely lined with a material like asbestos flexboard and covers should be made of the same material.

Corn Cribs:

Losses of stored corn in farm cribs have been known to be as high as a fourth or third of the winter carry over. In one case the U. S. Depart-

ment of Agriculture points out that the loss amounted to 500 bushels. The amount of this loss would have been sufficient to pay the rat-proofing bill in one year. Now, with the demand for increased production such waste can be considered unpatriotic.

The most common method of protecting the common slat type of farm bin is to cover the inside walls and ceiling and floor surfaces with wire, woven to two or three meshes to the inch. 15 gage material galvanized after weaving is the generally accepted product.

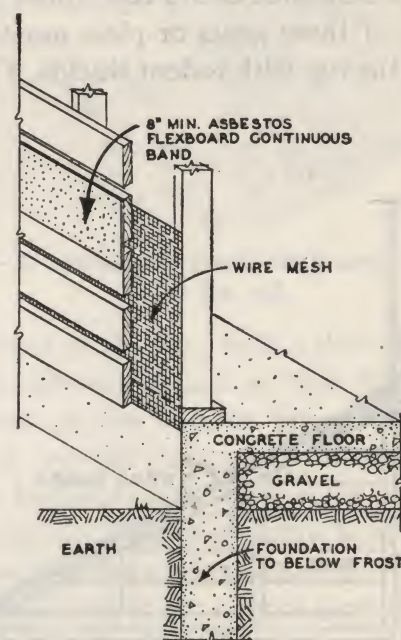


Fig. 53—Rat-proofing a corn crib with wire mesh and shield of asbestos flexboard.

A more economical use of wire would be lining the interior walls to a height of two feet with the wire and placing a 10" band of asbestos flexboard around the exterior of the building as shown in figure 53.

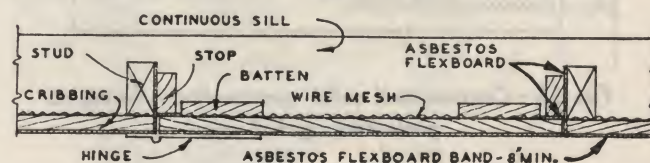


Fig. 54—Detail of corn crib showing how a rat shield of asbestos flexboard is carried across the doorway.

As rats are unable to gain a footing on hard, dense, smooth surfaces, the asbestos strip

would protect the portions of the building above it. Care should be taken, however, to butt the strips closely together at joints and to carry the material around both sides of doors and door jambs. See Fig. 54. Springs or weights should be provided at doors so that they will be self closing and to insure their remaining closed.

Floors of concrete are best suited to all types of corn cribs, but where elevated posts or piers must be used, care should be taken to allow a minimum clearance of 2½ feet under the crib. The tops of these posts or piers must be protected at the top with rodent shields. These can

be made of 3/16" asbestos flexboard, constructed so that they will extend 10" out from the posts. It is important, too, that the area beneath the crib be kept clear.

Outside Cellars

Cellarways with wooden steps, sills and earth floor are usually a source of rodent trouble that results in heavy losses to produce stored in them. The sill soon rots or the rats burrow under it to gain entrance. The remedy is to construct the cellarway and floor from concrete as shown in Figure 56.

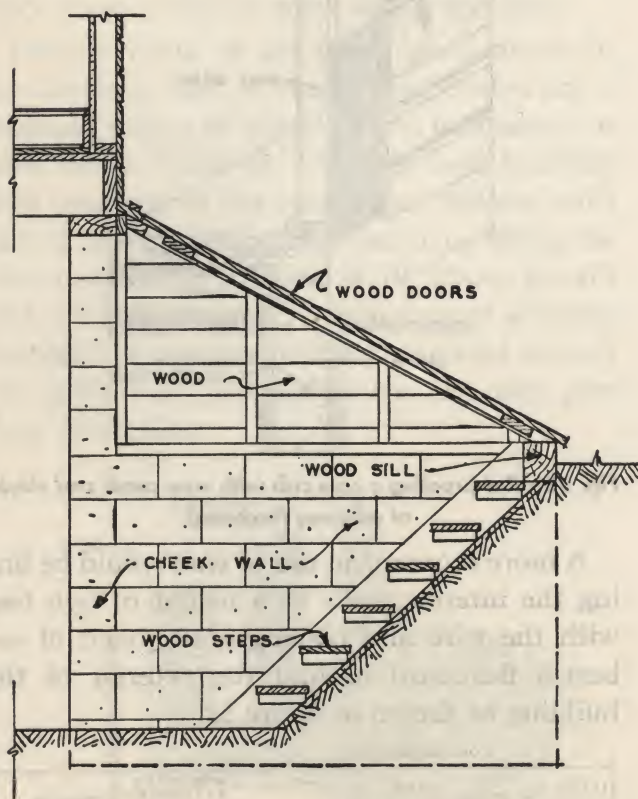


Fig. 55 - Conventional cellar construction offering no protection against rats.

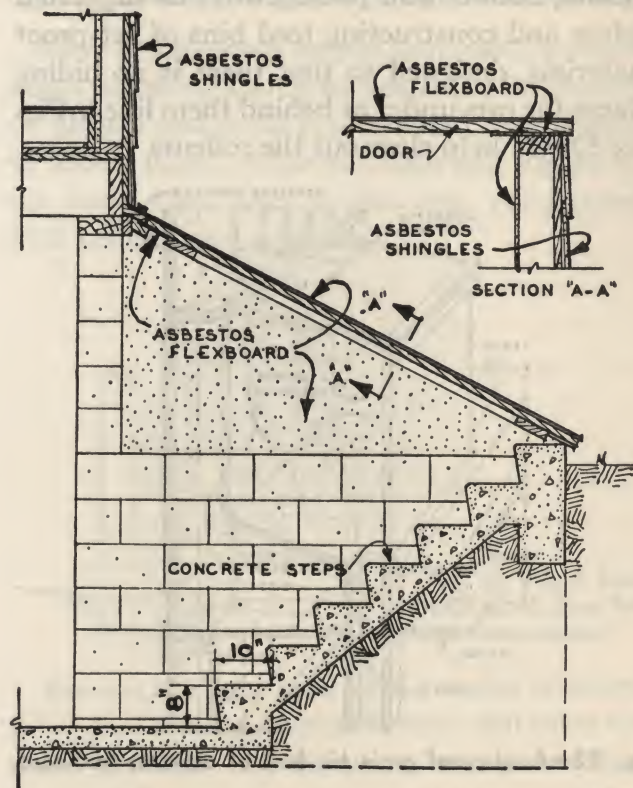


Fig. 56 - A rat-proof, permanent type of cellar.

TEMPORARY SILOS

THAT CAN DO A WAR JOB INEXPENSIVELY

How are your silos? Have you checked them recently? How about the lightning rod system? Has its ground been checked to see if it is still intact? The shortages in steel for hoops and reinforcing has curtailed production of silos drastically. If you need a new one, the chances are that you will find it difficult to buy. So take care of your present silo as it probably must last for the duration.

Silos built above ground are common to the American landscape because they are excellent for carrying succulent feed through the winter and in lean years, they are especially valuable in carrying feed over for an extra year.

Durable, fire and wind-resistant silos have proved to be the best long term investment to most farmers. That is the reason why so many concrete and tile silos have been built. Wood silos, too, have staged a strong comeback, especially since the new developments in treating the wood to prevent shrinkage and the resultant damage from wind, have become generally known.

On many farms, however, temporary silos have been used along with the permanent types to care for the unexpected extra production. These temporary silos have given excellent results and today, under war conditions, they will be more widely adopted because of the shortage in regular silos.

There are two general types of temporary silos that have proved satisfactory. The trench silo is by far the oldest type, in fact it is the original means used by man to carry feed through the winter. When properly sealed against air and surface water, it will preserve feed for years.

The trench or pit silo is not attractive, but it will do a war job and today that is the most important factor. It is simple to build because

it consists only of a large trench dug in the ground, as shown in Figure 57. The usual size is



Fig. 57 – A conventional trench silo is simply a hole dug in firm soil.

12 feet wide at the top, with a depth of 8 feet. The sidewalls are sloped so that the width is only 8 feet at the bottom. In most soils this slope will prevent caving or crumbling.

Many farmers prefer to seal the trench silo by covering the silage with straw to a depth of 3 inches and placing a layer of soil over the straw.

For sandy soil or for a more permanent silo, it is necessary to face the sloping banks with stone, brick or concrete as shown in Figure 58.



Fig. 58 – A permanent type of trench silo lined with brick, stone or cement. Recommended for sandy soil.

TEMPORARY SILOS

If there is a hillside on the farm, it is best to dig the silo into the side of the hill, to gain the benefits of natural drainage. This will prevent freezing and make it easier to load the silage out of the trench as it is needed.

A trench 12 feet wide at the top, with a depth of 8 feet, and sidewalls sloped to an 8 feet width at the bottom will provide 80 cu. ft. of storage space for each foot of length.

Of course if a hill is not available, trench silos can be built on level ground, but care must be taken to divert surface water from it.

A newer but simpler member of the temporary silo family that has been widely used by many farmers is the pen silo, built of snow fencing or chicken wire and lined with a layer of strong reinforced kraft paper. (Fig. 59). These pen silos are usually built 20 feet in diameter and rarely exceed 20 feet in height.

For grass silage, most farmers find that a double layer of paper is needed.

A canvas tarpaulin or sheets of building paper laid over the top of the silage forms an effective cover when weighted down so the wind does not blow it off.

The drawback to the pen silo has been the fact that silage cannot be carried over the summer months in them. For fall, winter and spring storage, they are satisfactory. There is an economy in the use of pen silos, too, as the first cost is low and as each section is fed out, the fence can be rolled up and saved for re-use the following year. New paper, however, should be used each year.

Temporary silos can and will do your war storage job satisfactorily. If you are not familiar with either of these types discuss them with your county agent.

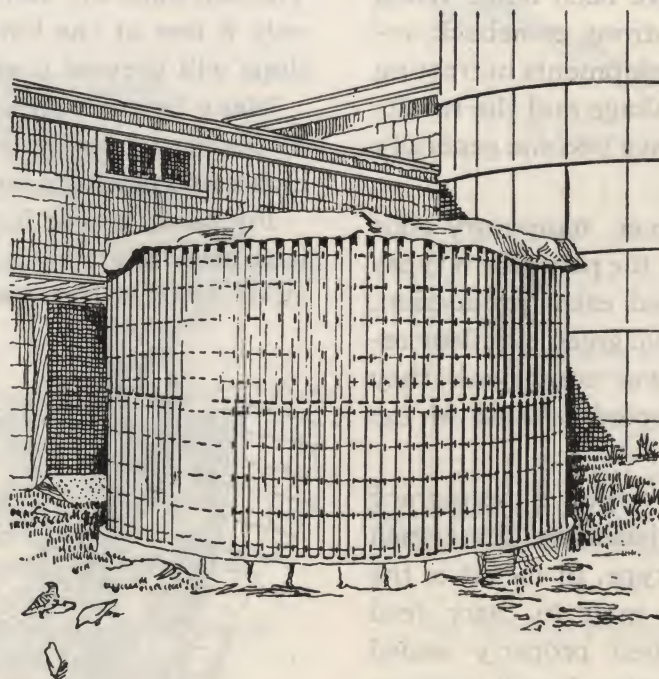


Fig. 59 - A temporary snow fence silo lined with kraft paper.
Can be built in sections as it is filled.

SOME RULES ON THE MAINTENANCE OF FENCES AND FENCE POSTS

Shortages in fencing materials have made it necessary to pay extra attention to the condition of our farm fence rows. Today it is important that every fence should last its maximum lifetime, as free from maintenance as possible.

Properly erected fencing of good quality will give little trouble. Careless erection, however, may cause constant waste of labor and money. Improperly set posts, loosely fastened wire, incorrect stretching and badly prepared ground, cause most of the fence failures.

When you repair your old fence, or put up a new one, these tips will save you money for a generation or more. There is no magic, just a few simple rules to follow:

1—Clear the ground along the fence row of all rocks, stumps, and irregularities so that the bottom of the fence will come close to the ground.

2—Posts are the backbones of your fence. They must be properly spaced and firmly set to insure maximum life for any fencing.

3—Line Posts should be equally spaced 12 to 16 feet apart along the fence line, except for barnyards where 10 foot spacing is more satisfactory. Before setting wood posts treat them

against decay, then set them in holes 2½ to 3 feet deep. Make the post hole big enough to allow packing and tamping down dirt and rocks around the post.

Your old anchored steel posts can be reused and usually set firmly with a post driver.

Where it may not be possible to level off the ground, special care must be taken with posts set in hollows, or they will become loosened and eventually pulled out by the tension of the wire fence. The best way to anchor such

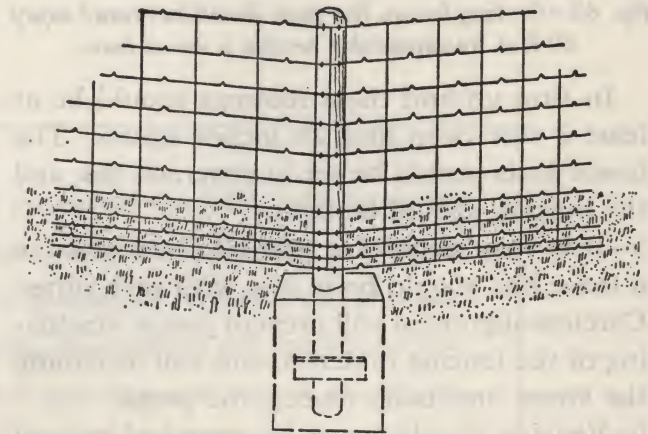


Fig. 60—When posts must be placed in a depression, set in concrete to prevent pulling. Drainage should be provided even though posts are treated

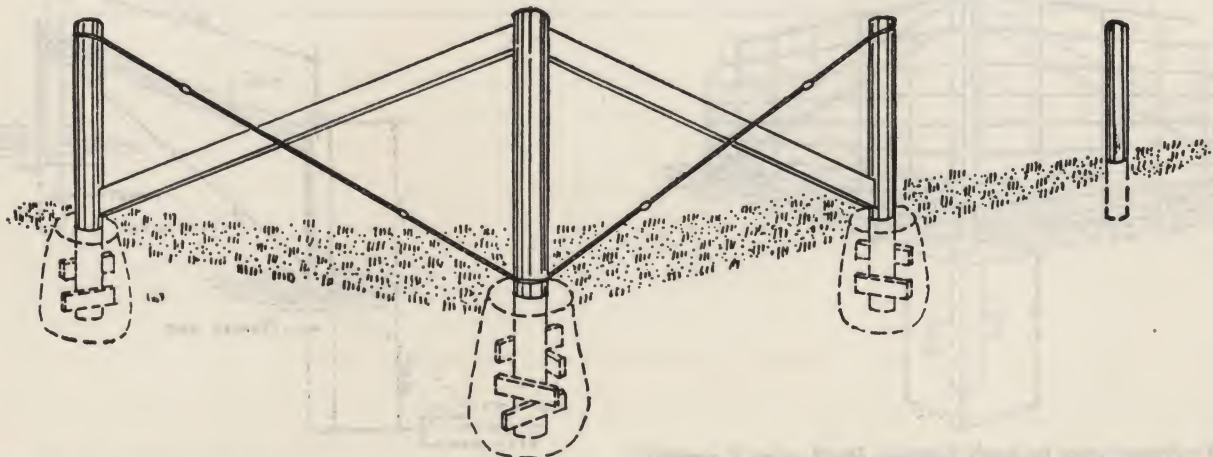


Fig. 61—Proper method of bracing corner posts. Top of the concrete pier should be sloped away to allow drainage.

poles is to set them in a tapered block of concrete at least 3 feet deep and 1 foot square at the top as illustrated in Figure 60.

4—Heavier posts are needed at corners and gates because of the extra stress at these points. These posts should be set in concrete as illustrated in Figure 62.

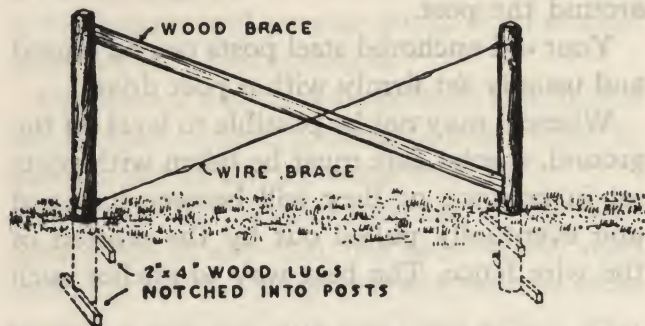


Fig. 62—On long fences, line posts should be braced every 60 feet. Recommended bracing is shown here.

In firm ground these footings should be at least 3 feet deep and 24 inches square. The brace posts should be set in concrete, too, and the bracing should be tight.

5—It is very important that all fence posts in a fence line should be in line with each other. Careless alignment will prevent proper stretching of the fencing material, and will distribute the stress unequally among the posts.

6—Fencing should never be stretched around a corner. Always stretch to the corner post and nail the fence securely; then cut the fence and start all over again as illustrated in Figure 63.

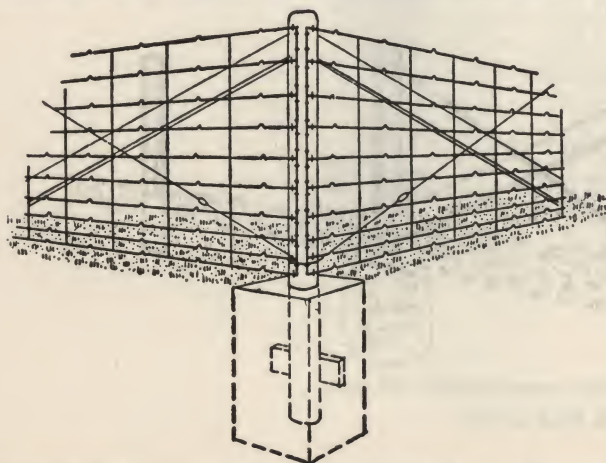


Fig. 63—Proper way to apply fencing. Don't wrap it around pole. Cut the fence wire as shown above.

7—Brace posts should be at least 7 inches in diameter and placed 9 feet from corner posts.

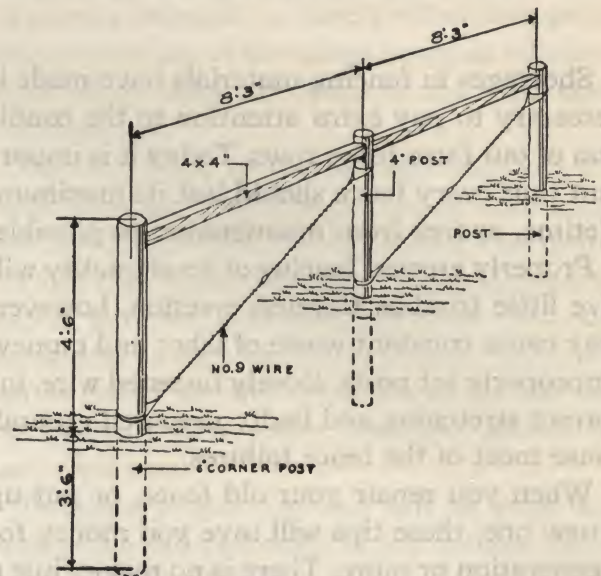


Fig. 64—The double span assembly for end and corner posts recommended by Iowa State College. Easy to build and relatively inexpensive.

8—Line posts should be at least 6 inches in diameter.

9—Don't drive the staples home. Allow for a slight movement of the fence under tension to equally distribute sudden stress on a number of poles.

10—Fences supported only by wood posts should be grounded every 9 rods. To be effective the ground connection should extend down to permanently moist soil.

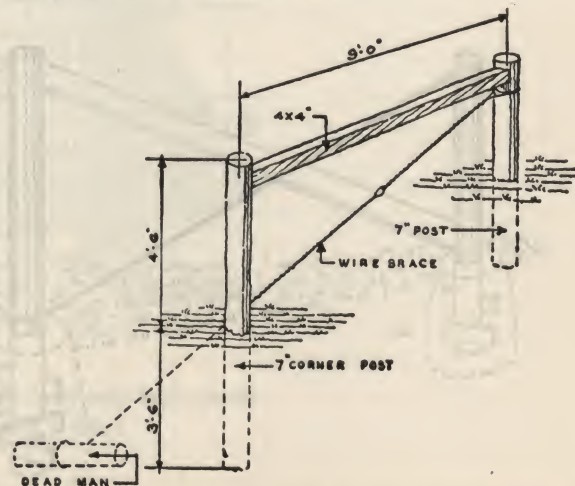


Fig. 65—Bracing end posts by use of dead man.

11—Concrete is porous and will not prevent rotting of wood posts. All wood posts should be treated with creosote.

12—A good concrete mix for anchor posts is: 1 part cement, 2 parts clean, dry sand and 4 parts clean, crushed gravel.

Re-using Old Fence Wire

Rolling old wire fencing is another way of saving.

Due to the shortages in barbed wire it will be necessary to take down fences that are not absolutely essential and restring the wire.

Rusted wire is usually brittle, making it hard to handle, but the work can be reduced by wrapping it on large diameter reels or on barrels or kegs. A simple reel can be made of wood and carried on an axel and a pair of wheels. A hand reel attached to the rear of a wagon box is frequently used in the west for wrapping old wire when long fences are to be removed.

Men working on barbed wire fences, often receive cuts, sometimes serious ones, especially when working on hilly ground or where the fence lines are overgrown with brush. Heavy gloves are recommended to protect the hands, but a good disinfecting solution and bandages should be kept available.

Your agricultural college is staffed with competent specialists who know the problems of agriculture in your state. They are constantly working to improve farming methods, types of crops, control of disease, etc. In these times of stress, when every acre must produce to capacity, this research and knowledge becomes of vital importance to the nation. If you have not been in touch with your agricultural college lately, why don't you write them about your problems. Just address your letter to the office of the Director of Extension. He will pass it on to the proper specialist.

JOHNS-MANVILLE RECOMMENDS THESE BUILDING MATERIALS FOR THE REPAIR AND MAINTENANCE OF FARM BUILDINGS

FOR YOUR ROOFS

J-M Asbestos Shingles cannot burn! They are rotproof and permanent as stone. Thousands in use 30 years or more and still in excellent condition. New American Colonial design is simple to apply. Several colors to choose from. Can be used for reroofing over old shingles or for new work. Because they require little if any maintenance expense, they are the most economical roof you can buy.

J-M Asphalt Shingles are made of highest quality ingredients and provide long years of satisfactory service. Heavily surfaced with mineral granules, they are fire resistant and rugged. Come in several styles and colors. We particularly recommend the thick butt shingle which provides extra protection on the part that is exposed to the weather. Easily applied.

J-M Asphalt Roll Roofings offer excellent value and utility per dollar of cost. Simple and easy to apply, fire resistant to a high degree, they provide inexpensive weather protection. Offered in several different weights and grades to meet almost any condition of service. Available with smooth surface, or with colorful mineral granules.

J-M Asbestos Roll Roofings are the most permanent type of roll roofing you can buy, because they are made of a felt composed of mineral asbestos fibres. These fibres are fireproof and will not rot or decay. J-M White Top asbestos roofing is particularly recommended for farms because its white asbestos surface helps reduce interior temperatures in hot weather.

J-M American Colonial Asbestos Flashing Felt is a fireproof, rotproof felt flashing material, widely used in industrial construction and now available to farmers through J-M building material dealers.

J-M Roof Coatings and Putties. Johns-Manville offers a complete line of durable, waterproof products:

Asbestos Fibrous Roof Coating — a high grade roof coating of asbestos fibres and asphalt. Adds new life to old, weatherworn roofs.

Regal Roof Coating — a non-fibrous asphalt coating. Prolongs life by penetrating the body and helps restore waterproof qualities.

Asbestos Roof Putty — a high grade roof putty of asbestos fibre and asphalt. Used for patching leaky roofs, repairing flashings, etc.

Asbestos Caulking Putty — a plastic asbestos waterproofing material for setting door frames, copings, scuttles, etc. Also for pointing up masonry and miscellaneous caulking.

FOR YOUR SIDEWALLS

J-M Asbestos Siding Shingles are recommended for the side walls of the farm house or any farm building. Can be used on new work, or right over the old siding of existing buildings. They are fireproof, rotproof and permanent as stone. Never require preservative treatment. A good looking weathertight exterior wall that reduces upkeep to a minimum.

J-M Weathertight Sheathing performs a double duty. It serves as a structurally strong sheathing and insulates as it builds. Impregnated with asphalt to afford protection against wind and moisture penetration. Furnished in large sheets it is easy and economical to apply.

FOR INSULATION

J-M Super-Felt Rock Wool provides maximum insulation for farm homes, and other farm buildings. Furnished in pre-fabricated batts of factory controlled thickness and density. Easy to handle. Fireproof and rotproof. Batts of full wall thickness are as effective in stopping the passage of heat as 11 feet of solid stone. Will not settle. J-M Batts have a vapor seal paper backing and are furnished in either full wall thickness or semi-thick.

J-M Insulating Board for Farm Buildings. It is furnished in large sheets and is one of the most versatile and widely used structural insulating materials. Sheets come in $\frac{1}{2}$ " thickness, by 4' wide and in various lengths. Adaptable to an almost countless number of farm building uses. Because of its excellent insulating qualities, it serves in two ways — as a structural building material and as insulation to help maintain proper temperatures.

FOR INTERIOR WALLS AND CEILINGS

J-M Standard Asbestos Flexboard is recommended for interior sanitation and fire protection. It is an asbestos cement building board that comes in large sheets with a hard, smooth surface. Will not rot, decay, corrode or burn. Primarily used as an interior lining, but suitable for exterior construction. Easy to clean. Requires no preservative treatment. Cuts and saws like wood — nails without splitting. Rodent-proof and durable.

J-M Insulating Board for Farm Homes. In addition to its use in farm buildings, J-M Insulating Board *in its decorative form* is an ideal building material for use in the farm home. It comes in attractive, colorful panels and planks with a smooth Glazecoat surface. Recommended for building extra rooms, or "doing over" old cracked plaster walls and ceilings. Can be applied to framing or over old wall or ceiling surfaces.

J-M Deluxe Asbestos Flexboard for Farm Homes. It's basically the same as Standard Asbestos Flexboard — a fireproof, rotproof, asbestos cement building material. But Deluxe Flexboard has a lustrous colorful finish that is "baked on." It is highly resistant to moisture and even steam vapor, and is therefore excellent for use in bathrooms and kitchens. Easy to clean. Comes in 8 lovely colors and 3 interesting designs. Easily applied.

Decorative Asbestos Flexboard for Farm Homes is an integrally colored asbestos cement sheet that is highly recommended for use as an inexpensive interior wall finish. It comes in 5 attractive colors with a polished surface that is easy to clean. Lower in price than Deluxe Flexboard, it is excellent for doing over bathrooms and kitchens on a limited budget.

FOR FULL INFORMATION ABOUT THESE JOHNS-MANVILLE BUILDING MATERIALS, CONSULT "THE FARM IDEA BOOK"

The Farm Idea Book as its name implies is a book of ideas and suggestions for repairs and essential improvements to farm buildings and the farm home. Illustrated in full color, it gives many interesting and practical recommendations for converting run-down buildings into useful units of production, or for improving the comfort and livability of the farm home and reducing maintenance costs. It includes articles on the subject of insulation, ventilation and sanitation. Describes the many J-M building materials that guard against destructive fire on the farm.

If you do not have a copy of the Farm Idea Book, see your Johns-Manville dealer.

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